THE LEGISLATIVE ASSEMBLY OF
BRITISH COLUMBIA

SPECIAL COMMITTEE
ON
SUSTAINABLE AQUACULTURE

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VOLUME ONE

THIRD SESSION, THIRTY-EIGHTH PARLIAMENT

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LEGISLATIVE ASSEMBLY
PROVINCE OF BRITISH COLUMBIA

May 16, 2007

To the Honourable
Legislative Assembly of the
Province of British Columbia

Honourable Members:

I have the honour to present herewith the *Final Report* of the Special Committee on Sustainable Aquaculture for the Third Session of the Thirty-Eighth Parliament.

The *Final Report* covers the Committee's activities from November 2005 to May 2007.

Respectfully submitted on behalf of the Committee.

Robin Austin, MLA
Chair

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Composition of the Committee

Members:

Robin Austin	Chair	Skeena
Ron Cantelon	Deputy Chair	Nanaimo-Parksville
Gary Coons		North Coast
Scott Fraser		Alberni-Qualicum
Gordon Hogg (to August 2006)		Surrey-White Rock
Al Horning (from September 2006)		Kelowna-Lake Country
Daniel Jarvis		North Vancouver-Seymour
Gregor Robertson		Vancouver-Fairview
Shane Simpson		Vancouver-Hastings
Claire Trevena		North Island
John Yap		Richmond-Steveston

Clerk to the Committee

Craig James, Clerk Assistant and Clerk of Committees

Committee Researchers

Brant Felker, Committee Research Analyst

Kathryn Butler, Committee Researcher (to March 2007)

Simon Gray-Schleihauf

TERMS OF REFERENCE

On November 22, 2005, the Legislative Assembly agreed that a Special Committee on Sustainable Aquaculture be appointed to examine, inquire into and make recommendations with respect to Sustainable Aquaculture in British Columbia and in particular, without limiting the generality of the foregoing to consider:

1. The economic and environmental impacts of the aquaculture industry in BC
2. The economic impact of aquaculture on BC's coastal and isolated communities.
3. Sustainable options for aquaculture in BC that balance economic goals with environmental imperatives, focusing on the interaction between aquaculture, wild fish and the marine environment.
4. BC's regulatory regime as it compares to other jurisdictions.
5. Solicit and consider written and oral submissions from any interested person or organization by any means the Committee considers appropriate;

The Special Committee so appointed shall have the powers of a Select Standing Committee and is also empowered:

a) to appoint of their number, one or more subcommittees and to refer to such subcommittees any of the matters referred to the Committee;
b) to sit during a period in which the House is adjourned and during any sitting of the House;
c) to adjourn from place to place as may be convenient;
d) to retain such personnel as required to assist the Committee;

and shall report to the House as soon as possible but no later than May 31, 2007 or following any adjournment, or at the next following Session, as the case may be; to deposit the original of its reports with the Clerk of the Legislative Assembly during a period of adjournment and upon resumption of the sittings of the House, the Chair shall present all reports to the Legislative Assembly.

ACKNOWLEDGMENTS

The Committee wishes to express its appreciation to everyone who assisted in our work. In particular, we would like to thank all those individuals and organizations who participated in the Committee's investigation, by writing or presenting at one of our public hearings. We would like to acknowledge the significant contribution of these individuals and organizations, as their participation was fundamental to our work.

We would also like to thank the people who we met during our site visits who shared their knowledge and time with us. Visiting these sites and seeing the various elements of the industry provided us with a unique and valuable opportunity to learn first hand from the people who work daily in the industry or live in areas affected by aquaculture.

In addition, the Committee would like to acknowledge the cooperation of senior government officials, academics, scientists and experts whose testimony and willingness to provide detailed information on complex issues have been essential in the Committee's investigation and deliberation on aquaculture issues in the province.

The Committee would also like to recognize the professionalism of Hansard Services in all the various phases of producing the transcripts of our meetings. A special thanks to Wendy Collison and Graham Caverhill, as well as the other Hansard staff who travelled with us in order to ensure that the deliberations were on the public record.

The Committee would also like to acknowledge the valuable assistance of Craig James and the staff from the Office of the Clerk of Committees. Mary Newell, Jacqueline Quesnel, Tamara Checknita, and Dorothy Jones handled the travel arrangements, meeting lists, and submissions. Brant Felker, our research analyst, provided research support throughout the process with the assistance of Kathryn Butler and Simon Gray-Schleihauf.

EXECUTIVE SUMMARY

The health of BC's wild salmon populations is paramount. The priority of protecting our wild salmon was voiced repeatedly at public hearings and throughout the Committee's briefings from scientists and expert witnesses.

The industries that are wholly dependent on wild salmon – sport fishing and the commercial fishery – represent a significant majority of our coastal economy and cannot be put at further risk. Although salmon aquaculture has grown and absorbed much of the recent economic decline of the wild fishery, there continue to be impacts on wild populations and ecosystems. These impacts must be minimized for the industry to continue operating in BC, and investments must be made in technologies that ensure this. Investments must also be made to rehabilitate and enhance wild salmon populations.

BC's economic development is evolving under the New Relationship with First Nations. The Committee's recommendations are fully cognizant of this New Relationship. These recommendations attempt to ensure the full inclusion of, and partnership with, First Nations in whose traditional territory fish farms are sited and those First Nations now living adjacent to those developments.

BC's North Coast is currently free of fish farms and wild populations remain healthy, contributing significantly to the region's economy. The Committee strongly recommends no salmon farm development north of Cape Caution.

Vancouver Island and BC's South Coast includes areas dense with salmon farms in the Broughton Archipelago, Discovery Islands and Clayoquot Sound. The Committee strongly recommends a transition to ocean-based closed containment technology to minimize impact on vulnerable wild stocks and ecosystems.

The Committee recognises such ocean-based closed containment is not yet in commercial use and so recommends government incentives for this transition. With this assistance available the Committee further recommends that farms that are not upgraded to ocean-based closed containment by the end of the transition period must cease operations.

Global Context

The world's fisheries are in a perilous state. Fish populations are rapidly collapsing due to over-harvesting caused in part by advanced fishing technologies. This is being driven by a dramatic increase in the consumption of fish protein.

Further, there has been degradation of marine ecosystems, from estuaries to coral reefs to ground-fish habitat. Climate change, which is triggering poorly-understood changes to ocean temperatures and currents, is also having a negative impact on world fish stocks.

The aquaculture industry is in a position to become the primary source of the world's fish protein. However it must demonstrate sustainability. If it does not, there will be a continuing, and potentially accelerated, collapse of fish stocks and increasing impacts on the marine ecosystems.

The sustainability imperative for aquaculture is to develop technologies and best practices that minimize impact on the marine environment, so that seafood can be grown and thereby reduce consumption pressure on the wild stocks.

The Committee heard that in Norway, environmental non-governmental organizations (ENGOs) and the aquaculture industry work closely together. The Committee recognizes that such a relationship is already developing in BC with the framework agreement between the Coastal Alliance for Aquaculture Reform (CAAR) and Marine Harvest Canada. With the consolidation of the industry this will likely evolve to include many existing sites. Other aquaculture companies have also expressed interest in working with ENGOs. Further, aquaculture companies are also developing co-operation agreements with First Nations. This must be recognized as a very positive approach for all of BC.

BC's opportunity

BC is blessed with globally significant wild salmon stocks and enormously productive and diverse marine ecosystems. These are of immense cultural value and provide crucial economic contributions. BC is globally unique in that we also have an established salmon aquaculture industry. It is important to note that the other major salmon farming nations – Norway, Chile, and the UK – do not have significant wild salmon populations.

The urgent challenge we face is to protect and enhance our wild salmon and marine ecosystems while maintaining our sizeable aquaculture industry. To succeed, BC must vigilantly protect the wild salmon and simultaneously become the home to the world's most technologically advanced aquaculture industry.

The opportunity we have is that other nations, without comparable challenges, are less motivated to develop sustainable technologies. BC can develop ocean-based closed containment technology that will lead the world and which can be marketed internationally. Further, the salmon harvested in this ocean-based closed containment can be marketed domestically and internationally as sustainably-farmed salmon.

Huge advances in technology have already occurred within BC over the past 25 years. One example is the advance in feed technology which reduces the amount of fish meal and fish oil needed to rear salmon in captivity, and replaces it with non-protein sources and replacement oils and enzymes. A second example is the development of effective vaccines that have improved fish health and are now exported throughout the world.

If we can lead in these areas of technology then we must also use our talent and expertise to tackle the most challenging aspect of the aquaculture industry: namely, creating an effective barrier within the ocean between the farmed and the wild fish. Such a barrier will answer many of the concerns that the Committee heard in its public hearings and in numerous submissions. It would allow the industry to collect waste, it would avoid the transfer of sea lice and disease between adult farmed salmon populations and juvenile migrating salmon, and it would provide a safeguard to protect other marine life which are attracted to and prey on salmon farms.

The Committee believes that these are not lofty goals but practical applications to ensure the health of our wild salmon populations and marine ecosystems, while allowing for continued growth and development of the aquaculture industry.

Shellfish Aquaculture

With adequate government support and oversight shellfish aquaculture can be expanded greatly in this province. The shellfish industry has great potential to grow into a robust commercial sector provided the appropriate siting and operational regulations are in place. By combining proper regulation with a growth strategy that is developed with First Nations, British Columbia can become a significant shellfish producer rather than a minor player on the world stage.

Wild Salmon Renewal

Due to the emphasis in our public meetings and written submissions the Committee recognized a need to put forth ideas to promote success of our wild salmon populations. Significant investment, in partnership with the Government of Canada, is required to ensure vulnerable stocks recover and the total wild salmon population increases.

Conclusion

The Committee believes that British Columbia has a unique opportunity to protect and enhance our wild salmon populations and marine ecosystems while developing a thriving, innovative aquaculture industry. If the finfish aquaculture industry is to expand and prosper it must minimize its impact on wild salmon and ecosystems. The shellfish industry must improve siting. In all cases First Nations with cultural knowledge of the areas must be fully involved and capacity provided to ensure this can occur. These opportunities and challenges are outlined in our report, which we submit with confidence that the BC government will implement our achievable and balanced recommendations.

The New Relationship

The Committee strongly recommends that the Ministry of Agriculture and Lands as well as the Ministry of Environment adhere to the principles of the New Relationship as defined by the current government when partnering with First Nations on all aquaculture issues—whether that be development, siting, compliance or enforcement. Furthermore, the First Nations in whose traditional territory the farms are sited, and those who are now settled adjacent to areas where farms are sited, must be provided with financial and physical capacity, and assisted wherever necessary to ensure an active, equal partnership.

The New Relationship

I. Statement of Vision

We are all here to stay. We agree to a new government-to-government relationship based on respect, recognition and accommodation of Aboriginal title and rights.

We agree to establish processes and institutions for shared decision-making about the land and resources and for revenue and benefit sharing

III. Principles to Guide the New Relationship

We will mutually develop processes and implement new institutions and structures to achieve the following:

- integrated intergovernmental structures and policies to promote co-operation, including practical and workable arrangements for land and resource decision making and sustainable development;
- efficiencies in decision-making and institutional change;
- recognition of the need to preserve each First Nations' decision-making authority;
- financial capacity for First Nations and resourcing for the Province to develop new frameworks for shared land and resource decision-making and to engage in negotiations;
- mutually acceptable arrangements for sharing benefits, including resource revenue sharing; and
- dispute resolution processes which are mutually determined for resolving conflicts rather than adversarial approaches to resolving conflicts.

This vision statement to establish a new relationship has been written as a measure of good faith by the parties to put into words our commitment to work together to explore these concepts and develop their full meaning.

May 4, 2006

LIST OF MEETINGS

November 24, 2005	Victoria	Election of Chair
February 1, 2006	Victoria	Briefing
February 2, 2006	Victoria	Review of Business Plan
March 6, 2006	Victoria	Meeting
April 25, 2006	Victoria	Briefing
May 18, 2006	Victoria	Planning Session
June 1, 2006	Vancouver	Briefing
June 5, 2006	Nanaimo	Public Hearing
June 6, 2006	Tofino	Public Hearing
June 7, 2006	Campbell River	Public Hearing
June 19, 2006	Kitkatla	Public Hearing
June 19, 2006	Prince Rupert	Public Hearing
June 20, 2006	Terrace	Public Hearing
June 21, 2006	Kitwanga	Public Hearing
June 21, 2006	Hazelton	Public Hearing
June 26, 2006	Alert Bay	Public Hearing
June 27, 2006	Sointula	Public Hearing
June 27, 2006	Port McNeill	Public Hearing
June 28, 2006	Port Hardy	Public Hearing
August 3, 2006	Victoria	Briefing
October 6, 2006	Bella Bella	Public Hearing
October 6, 2006	Bella Coola	Public Hearing
October 7, 2006	Smithers	Public Hearing
October 11, 2006	Campbell River	Public Hearing
October 17, 2006	Sechelt	Public Hearing
October 18, 2006	Vancouver	Public Hearing
October 19, 2006	Victoria	Public Hearing
November 14, 2006	Klemtu	Public Hearing
November 15, 2006	Campbell River	Briefing
November 24, 2006	Vancouver	Public Hearing
November 30, 2006	Vancouver	Briefing
December 1, 2006	Vancouver	Briefing
December 5, 2006	Vancouver	Briefing
December 6, 2006	Victoria	Briefing
January 29, 2007	Vancouver	Briefing
February 16, 2007	Vancouver	Briefing
February 19, 2007	Victoria	Briefing
March 2, 2007	Nanaimo	Briefing
March 12, 2007	Victoria	Briefing
April 17, 2007	Victoria	Meeting
May 7, 2007	Victoria	Meeting
May 9, 2007	Victoria	Meeting
May 14, 2007	Victoria	Meeting

INTRODUCTION

The Special Committee on Sustainable Aquaculture was tasked to inquire into and give recommendations on:

- The economic and environmental impacts of the aquaculture industry in BC;
- The economic impact of aquaculture on BC's coastal and isolated communities;
- Sustainable options for aquaculture in BC that balance economic goals with environmental imperatives, focusing on the interaction between aquaculture, wild fish and the marine environment;
- BC's regulatory regime as it compares to other jurisdictions.

During the 18-month inquiry, the Committee conducted an extensive public consultation process; travelled to 21 communities around the province; collected 814 written submissions; received testimony from more than 80 expert witnesses; visited 16 sites; and commissioned an economic study of the wild and farmed salmon industries.

Through the process, the Committee identified a number of key areas in which to focus its attention.

These included:

- The economic impact of aquaculture, the wild salmon fisheries, and the sport fisheries in coastal and isolated communities in British Columbia;
- The environmental impacts of salmon aquaculture practices on the marine environment;
- The current practice of open-net pen salmon farming, and possible viable alternatives;
- The current siting process and monitoring of salmon farms;
- The shellfish aquaculture industry.

The Committee also heard very positive ideas and approaches which are being developed to bring the aquaculture industry and environmental non-governmental organisations together. Current examples of this are the Coastal Alliance for Aquaculture Reform and Marine Harvest Canada's protocol agreement, and further industry and First Nations' agreements.

Two concepts underpinned much of the Committee's deliberations: that of the New Relationship and how to make sure that its principles underlined the continued development of the aquaculture industry; and that of ecosystem-based management, which seeks to integrate healthy full-functioning ecosystems and human communities.

After careful deliberation, members of the Special Committee on Sustainable Aquaculture made 52 recommendations; including:

- A time referenced transition to ocean-based closed containment, to be implemented with transition assistance and incentives for the industry;
- No fish farms north of Cape Caution;

- Changes in the monitoring and regulatory frameworks to prevent perceptions of self-policing;
- A provincially supported pro-active marketing strategy which will promote the evolving sustainable aquaculture industry;
- Locations designated for shellfish aquaculture which minimize competition with residential and recreational use.

Committee Activity and Summary of the Public Consultation Process

Committee Activity

The Special Committee on Sustainable Aquaculture is an all-party committee of the Legislative Assembly of British Columbia and is appointed to undertake business on behalf of the Assembly.

On November 24, 2005, the Special Committee met to review the terms of reference, including the logistical and procedural details of its inquiry. The Chair, Deputy Chair and members of the agenda and procedure subcommittee were elected.

In its business plan, the Committee agreed to hear briefings from witnesses, conduct public hearings throughout the province, issue a call for written submissions, issue a request for proposals for a study on the economic impacts and prospects of the salmon farming and wild salmon industries in British Columbia, and conduct information-gathering trips to various aquaculture-related sites.

The Committee was re-struck for the second and third session of the 38th Parliament, continuing with the terms of reference outlined in the first session.

Public Hearings

The Special Committee on Sustainable Aquaculture held a number of public hearings in June, October, and November 2006 to consider oral submissions from all interested persons or organizations.

The Committee visited communities on Vancouver Island, the South, Central and North Coast, as well as a few inland communities. The Committee decided to not only travel to areas impacted the most by aquaculture activities, but also visit locations where proposals for finfish aquaculture expansion were being considered, as well as communities reliant on wild salmon.

June 5, 2006	Nanaimo	June 28, 2006	Port Hardy
June 6, 2006	Tofino	October 6, 2006	Bella Bella
June 7, 2006	Campbell River	October 6, 2006	Bella Coola
June 19, 2006	Kitkatla	October 7, 2006	Smithers
June 19, 2006	Prince Rupert	October 11, 2006	Campbell River
June 20, 2006	Terrace	October 17, 2006	Sechelt
June 21, 2006	Kitwanga	October 18, 2006	Vancouver
June 21, 2006	Hazelton	October 19, 2006	Victoria
June 26, 2006	Alert Bay	November 15, 2006	Klemtu
June 27, 2006	Sointula	November 24, 2006	Vancouver
June 27, 2006	Port McNeill		

Prior to the public hearings, the Committee issued press releases and placed advertisements in local and provincial papers.

The public hearings were open to anyone who wished to express their views or provide recommendations for any aspect of the Committee's mandate. This approach was used to get a sense of what the issues were according to the general public, rather than direct the public with specific questions.

In total, the Committee heard from 275 individuals and organizations at the 21 public meetings. All individuals and organisations that presented to the Special Committee on Sustainable Aquaculture are listed in Appendix C.

Written Submissions

On March 25, 2006, the Committee issued a call for written submissions on the issues set out in its terms of reference. The initial date for accepting written submissions—July 31, 2006—was extended to October 31, 2006. The extension was meant to accommodate numerous requests from individuals unable to submit a letter by the original deadline.

By the deadline, the Clerk of Committee's office had received a total of 814 written submissions.

Taking a similar approach to the public hearings, the written submissions were not limited to a particular aspect of our mandate. Because of this, a wide range of materials were submitted – from peer-reviewed scientific articles, to form letters from industry employees and environmental organizations. Submissions arrived from remote locations such as Kitkatla and as far away as Norway.

All individuals and organizations that submitted a written submission to the Special Committee on Sustainable Aquaculture are listed in the Appendix D of this report.

Figure 1: Distribution of written submissions.

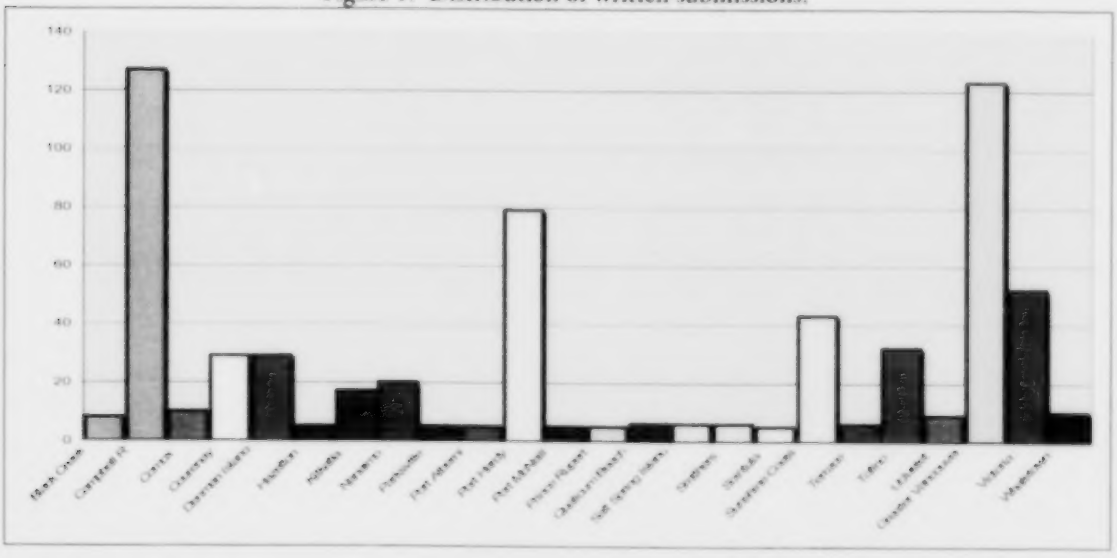
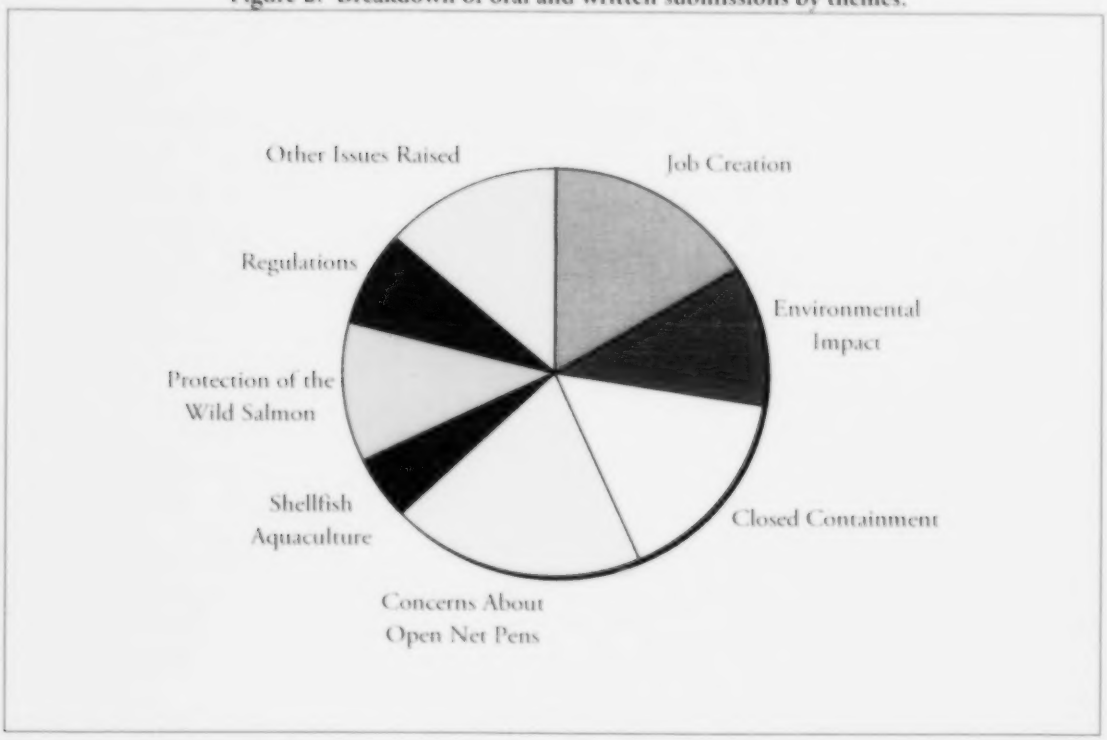


Figure 2: Breakdown of oral and written submissions by themes.



SITE VISITS

In conjunction with the public hearings, the Committee took the opportunity to conduct site visits to aquaculture-related locations along the coast of British Columbia. The Committee felt it was important to meet with people working in the industry who had a first-hand account of day-to-day operations.

We visited 16 aquaculture-related sites that included salmon farms, closed containment and manufacturing facilities, processing facilities, research facilities, shellfish facilities, and a tour of the Broughton Archipelago.

SALMON FARMS

Mainstream Canada Westside Farm/Creative Salmon Baxter Farm, Tofino (June 6, 2006)

Mainstream Canada is the Tofino's largest full-time employer with 140 employees. Committee members visited Mainstream's Westside farm site outside of Tofino and were shown various aspects of operating a farm. For some Committee members, this was their first visit to a salmon farm. Members learned that Mainstream Canada has a protocol agreement with and works closely with the Ahousaht First Nation as the company operates in their traditional territory. In 2006, Mainstream Canada estimated it would spend $100 million in expenses—$50 million in the Tofino area alone.

While in Tofino, the Committee also travelled to the Baxter chinook farm site operated by Creative Salmon. Creative Salmon is a Canadian-owned company that provides direct employment for 44 FTEs. Members spoke with the elected chief of the Tla-o-qui-aht First Nation who explained the benefits of an agreement reached with Creative Salmon in regarding their farm operations on traditional territory.

Creative Salmon Baxter farm

Marine Harvest Canada Sonora Point Farm, Johnstone Strait (June 7, 2006)

While in Campbell River for a public hearing, the Committee toured the Johnstone Strait/Discovery Islands area by float plane to view some of the fish farm sites in the region. The Johnstone Strait is one of the most active areas in the province for aquaculture. Members had the chance to visit Marine Harvest Canada's Sonora Point site, observe the feeding of Atlantic salmon, and speak with the employees about various procedures involved with fish feeding and monitoring of feed supply.

Closed Containment and Manufacturing Facilities

PRAqua, Nanaimo (June 5, 2006)

Members met with the owner of an engineering and manufacturing company and visited his facility which specializes in fish culture and water treatment equipment for the aquaculture industry. At the facility, committee members were shown some innovations in tank design technology, including filtration systems, mobile pumps and circulation tanks. Many of the products that come out of this facility in Nanaimo are being used by both industry and the Fisheries and Oceans Canada (DFO).

Agrimarine, Campbell River (June 5, 2006)

In Campbell River, committee members visited the site of a future floating tank salmon farm project and discussed with its designer the prospects and viability of operating such a system in the province.

The ocean-based closed containment project follows an experimental inland tank system tested in Cedar, BC by Agrimarine and supported by the Ministry of Agriculture and Lands in 2003.

Target Marine, Sechelt (October 17, 2006)

Target Marine operates eight marine grow out sites (salmon farms), a processing plant and hatchery in the Sechelt area. The company was locally owned and managed—employing between 105 and 125 people.[1] Members met with the owner and toured the operations, including land-based facility where white sturgeon are being raised for caviar production.

PROCESSING FACILITIES

Walcan Seafoods, Quadra Island (June 5, 2006)

Committee members visited Walcan Seafood processing facilities on Quadra Island and were given a tour of the plant during production. Walcan Seafoods is Quadra Island's largest employer, and processes herring, prawns, wild salmon and farmed salmon. The facility has been in operation since 1974 and operates year-round.

Walcan employs approximately 150 people and has an annual payroll of approximately $6 million.

Englewood Packing, Port McNeill and Alpha Processing, Port Hardy (June 28, 2006)

The Committee visited two processing facilities on the North Island—the Alpha processing plant in Port Hardy, and the Englewood packing facilities in Port McNeill. Englewood Packing employs 130 full-time people and injects $4.6 million into the community of Port McNeill.[2]

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[1] Since the site visit, it was announced that the salmon farm operations of Target Marine were bought by Grieg Seafood.

[2] Englewood Packing has announced that it will cease operations in Summer 2007.

Although Alpha Processing was currently closed at the time of the tour due to refitting, they normally employ 103 people, with 59 percent women, and 25 percent First Nations. There is also space for expansion at the plant.

Klemtu Seafoods, Klemtu (November 14, 2006)

The fish processing facilities were in full operation when the Committee visited the site in the isolated Central Coast community of Klemtu. The plant operates four days a week for eight months of the year, and is the main employer in the community. Marine Harvest Canada, which operates the facilities and farm sites in the area, provides close to 50 percent of the overall economy in Klemtu. The payroll between the plant and the farm sites is approximately $1.2 million.

RESEARCH FACILITIES

Fisheries and Oceans Canada Pacific Biological Station, Nanaimo (June 5, 2006)

The Committee toured the science labs of the Fisheries and Oceans Canada Pacific Biological Station (PBS), and talked with scientists undertaking various research projects. Members visited fish health laboratories, where research was being conducted on disease risks to wild populations, including the use of antibiotics. Members also saw the molecular genetics labs which allow Fisheries and Oceans scientists to identify strays from salmon farms in local wild salmon populations. The Committee had the opportunity to see the current sea lice controlled infection studies on sticklebacks as well as hear comments about their impacts on juvenile pink and chum salmon.

Fisheries and Oceans Canada Pacific Biological Station in Nanaimo

Centre for Shellfish Research – Malaspina University College, Nanaimo (June 5, 2006)

The Committee was given a tour of the facilities, and shown the current research being conducted in the areas of shellfish health, husbandry, and ecological interactions. The Committee also heard about the development of the new Deep Bay Field Site. When complete, the new seven acre site will facilitate the means for aquaculture research and training in Nanaimo.

Centre for Aquatic Health Sciences, Campbell River (November 15, 2006)

Members of the Committee visited the Centre for Aquatic Health Sciences lab while in Campbell River. The Centre is a non-profit organization focussing on fish health, fish welfare, and food safety. Members viewed current research that was being conducted; including ATPase testing of wild and farmed smolts, and virology testing of broodstock. The Committee also learned about a GIS based environmental model that was being developed for a northern coastal community.

The Committee spoke with the CEO who said the future objectives of the centre included bringing scientific capacity to the North Island and supporting local research needs by partnering with other institutions which would facilitate the transfer of information and collaborative research.

Malaspina University College, Nanaimo

SHELLFISH FACILITIES

Island Scallops, Fanny Bay (April 27, 2007)

Members of the committee visited the Island Scallops farm site and processing facilities. The farm site in Baynes Sound uses subsurface cages (30 feet) to grow scallops in an 18-24 month cycle.

Members heard about the sustainable farming practices – which require no chemicals or food to grow. The company also cultivates and processes its scallops locally, in Qualicum Beach, thereby bringing employment to the area.

TOUR OF THE BROUGHTON ARCHIPELAGO

June 26, 2006

The Special Committee was given a tour of the Broughton Archipelago hosted by the Musgamagw Tsawataineuk Tribal Council (MTTC) chiefs and staff. The members visited traditional food gathering clam beds near Mamalilikulla at Village Island, spoke with a local shrimp fisherman, and passed by the new Bennett Point fish farm.

The Committee also visited Echo Bay, where a resident biologist was conducting research on sea lice and small pink and chum fry.

Echo Bay, Broughton Archipelago

Witness Briefings

The Committee met with more than 80 senior government officials, scientists, academics and industry experts during the course of our inquiry. We were briefed on a number of topics pertinent to the mandate of the committee; including:

- Briefings from the various agencies involved with aquaculture in British Columbia including
    - Ministry of Agriculture and Lands
    - Ministry of Environment
    - Fisheries and Oceans Canada
    - Coastal Mayors;
- Historic overview of the aquaculture regulatory regime in British Columbia;
- Association briefings by the British Columbia Salmon Farmers Association;
- Association briefings by the Coastal Alliance for Aquaculture Reform;
- Briefings by the geoduck and sablefish industry;
- Science panel discussion on sea lice infestations in the Broughton Archipelago;
- Briefings from international scientists and government officials.

A detailed overview of the witness briefings are found in Appendix A.

COMMITTEE FINDINGS AND RECOMMENDATIONS

ECONOMIC IMPACTS

British Columbia is the fourth-largest farmed salmon producer in the world. Farmed salmon is also the province's largest agricultural export and creates direct and indirect jobs, largely in coastal and isolated communities on Vancouver Island and the south coast. However, it is not the only employer or economic driver on the coast. In order to get a better picture of these economic balances, the Special Committee issued an RFP for an independent economic study on the farmed and wild salmon industries in BC.

The Committee determined that a recent independent study which aggregated information on the two industries would benefit not only the government, but add to the growing body of research on the subject.

The Committee retained the services of MMK Consulting to conduct the study on the economic impacts and prospects of the salmon farming and wild salmon industries.

The executive summary follows and the report in its entirety is listed as an appendix to this report.

MMK CONSULTING: EXECUTIVE SUMMARY

This report assesses the economic impacts and prospects of the salmon farming and wild salmon industries of British Columbia. It has been performed by MMK Consulting, on behalf of the BC Legislative Assembly's Special Committee on Sustainable Aquaculture.

1. Direct economic impacts

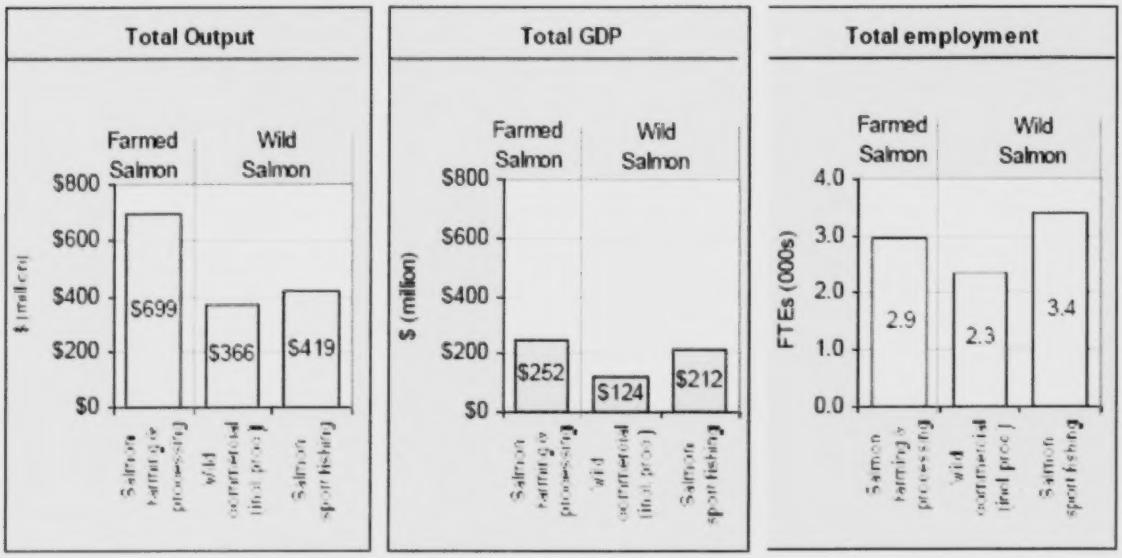
The **salmon farming** sector, including both aquaculture production and processing activities, accounted for $371 million in direct output and contributed $134 million to provincial GDP in 2005. The industry also provided an estimated 1,500 full-time equivalent jobs.

The **wild commercial salmon** sector, including both capture and processing activities, accounted for $216 million in direct output, and $67 million in GDP. Salmon harvesting and salmon processing activities provided approximately 1,600 full-time equivalent jobs, mostly in processing. (In addition to processing BC-caught salmon, BC companies also process significant volumes of Alaska-caught salmon, accounting for $37 million (48%) of the value of salmon canned in BC in 2005.)

The **salmon sport fishing** sector accounted for approximately $231 million in output and contributed $116 million to provincial GDP, providing 2,280 full-time equivalent jobs.

2. Direct, indirect and induced impacts

Exhibit ES-2 illustrates the estimated indirect and induced impacts associated with each sector[3].



Multiplier effects are significant for all the industry sectors. They tend to be strongest in the salmon farming industry, especially with respect to indirect employment generated by service providers to this industry. Average value added (GDP) per FTE is highest for the salmon farming industry ($86,000), followed by salmon sport fishing ($62,000) and wild commercial salmon ($53,000)

3. Economic Trends

Economic trends in recent years have differed greatly among sectors:

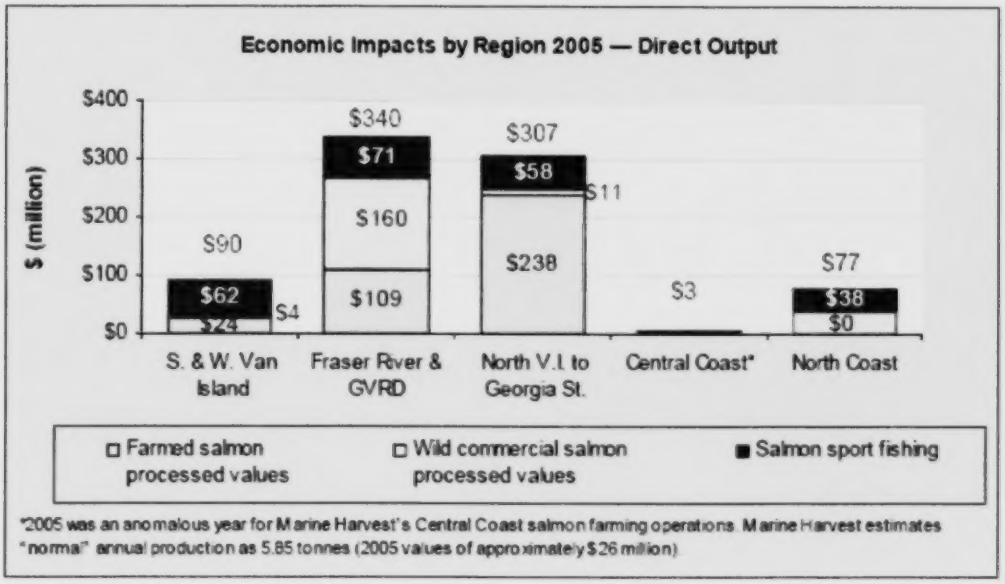
- The **salmon farming** industry nearly doubled its size between 1997 and 2005, both in terms of production volumes and output value. Preliminary figures for 2006 indicate a more than 15% increase in production volumes over 2005.
- The size of the **wild commercial salmon** industry declined significantly between 1997 and 2005, with total output values decreasing by more than 30%.
- For the **salmon sport fishing** sector, economic indicators show an overall decline in fishing activity since 1997. However, the overall indicators also mask very different regional trends:
  - Angler boat-trips in Georgia Strait declined by 68%, partly offset by increased angling activity in the Fraser River.
  - Activity levels and catches were significantly up on the West Coast of Vancouver Island, and in the North/Central Coast.

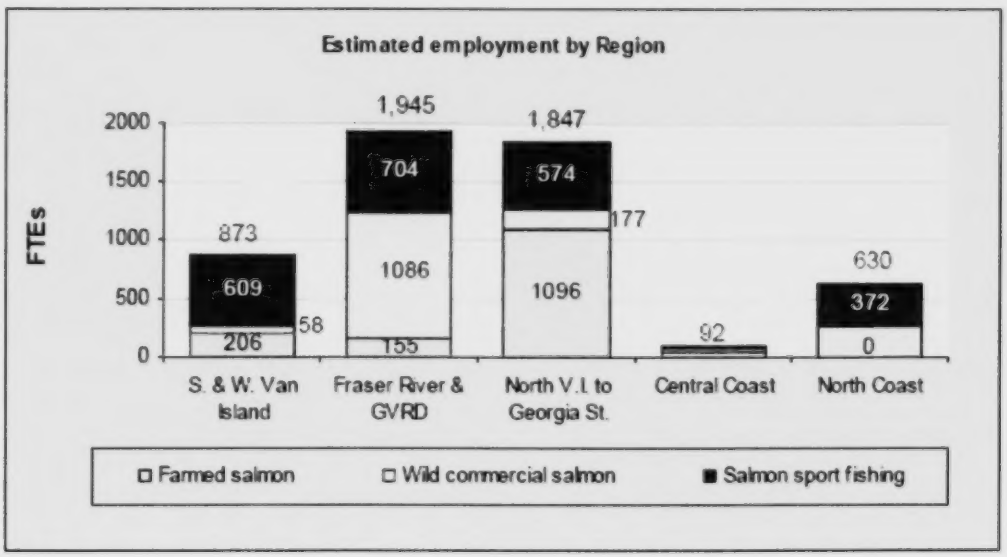
[3] These figures are generally based on BC Input Output Model (BCIOM) multipliers, adapted to reflect the objectives and scope of this study.

4. Regional analysis

As illustrated in Exhibit ES-3, the relative economic importance of the salmon-based industries varies by region[4].

Exhibit ES-3 — Regional results for total output and total employment





[4] Regions are defined as follows:

Region #1 - South and West Vancouver Island: includes Alberni-Clayquot and Capital Regional Districts.

Region #2 - Fraser River & GVRD: includes Greater Vancouver and Fraser Valley Regional Districts.

Region #3 - North Vancouver Island to Georgia Strait: includes Sunshine Coast, Powell River, Comox-Strathcona, Nanaimo, and Mt. Waddington Regional Districts.

Region #4 - Central Coast: includes Kitimat-Stikine and Central Coast Regional Districts.

Region #5 - North Coast: includes Skeena-Queen Charlotte Regional Districts.

Salmon farming is heavily concentrated in Region 3. Significant salmon farming aquaculture operations also exist in Region 1, and significant processing operations exist in Region 2.

Wild commercial salmon fishing operations are most significant in Regions 2, 3 and 5. Processing operations are located primarily in Regions 2 and 5.

Sport salmon fishing represents a relatively significant share of the salmon-based economy in all regions. While activity levels have declined in the Strait of Georgia in recent years, sport fishing still represents a significant share of salmon-related economic activity in Regions 1 and 2.

5. Other salmon-reliant industries and sectors

A number of other BC tourism-related industry segments have a strong economic interest in the ongoing health of wild salmon stocks. These segments include marine wildlife viewing, ocean kayaking, boat charters, scuba diving, sail cruising, pocket cruising, and freshwater fishing. Based on a previous industry study, the total direct revenues for these other segments in 2001 is estimated as approximately $214 million.

6. Economic prospects

For **salmon farming**, the industry's economic prospects are assessed as strong in the short to medium term. In the longer term, the industry's success will be determined by the growth of North American demand, international competition (particularly from Chilean farmed salmon), and the industry's ability to expand production levels.

For **wild commercial salmon**, the industry's economic prospects depend on future access to salmon (allowable catches), market price trends, development of niche markets, and further industry rationalization and restructuring.

For **salmon sport fishing**, the industry's economic prospects will depend on the quality of the opportunity for sport fishing. If current trends continue, activity levels and expenditures will likely continue to decline in Georgia Strait while growing in other regions.

	Salmon farming	Wild commercial salmon	Salmon sport fishing
Barriers/ threats to growth	• Environmental impact concerns • New site availability • First Nations issues • Regulations on current operations • International ownership and competition for new investment • Market competition and price fluctuations • Changing consumer demographics and product preferences	• Precautionary resource management • Reduced access to chinook/coho • Environmental risks to wild stocks • Market competition from farmed salmon • Capture overcapacity and unprofitability • Consistency of product, price levels • Competition from Alaska canneries • Competition for Alaska salmon from Chinese processors	• Environmental threats to wild stocks • Poor fishing in Georgia Strait • Future quality of fishing in other areas
Opportunities for growth	• Strong prices in US fresh market • Improving production yields • Partnering with wild salmon distributors	• Increased harvest levels • Further industry restructuring • Improved product quality and consistency • Premium-price niche markets	• Good salmon fishing outside Georgia Strait • Growth in other salmon-related tourism • Possible partial recovery in Georgia Strait
Assessment of Prospects	• Very strong in short to medium term • Long term depends on ability to expand production	• Weak in the short to medium term • Long term depends on industry restructuring	• Poor in Georgia Strait, strong elsewhere

(End of MMK Executive Summary.)

Shellfish Aquaculture

It was determined that because the primary focus of the Committee was salmon and finfish aquaculture the economic report should not try to examine the financial health or prospects of the shellfish aquaculture industry. There was, however, significant interest expressed to the Committee about shellfish aquaculture from witnesses, coastal residents, First Nations and the industry itself.

The shellfish aquaculture industry is comprised of more than 460 sites, contributing 800 on-farm jobs. Below are the 2003 statistics provided by Ministry of Agriculture and Lands for total production and farmgate value of the shellfish aquaculture industry in British Columbia.[5]

Source: Ministry of Agriculture and Lands Fishery Statistics

BC Shellfish Aquaculture Harvests and Values 2003		
Species	**Production ('000 tonnes)**	**Farmgate Value ($millions)**
Oysters	7.0	7.6
Clams	1.5	7.6
Scallops & Mussels	0.1	0.7
Total	**8.6**	**15.9**

Public Inquiry

As we travelled to coastal communities in British Columbia where there were aquaculture-related activities, we talked with people about the employment that industry has created. In some areas, the closure of commercial fishing operations and the loss of logging had led to unemployment and economic hardship.

We also heard from individuals and organizations that viewed salmon farming as both a threat to the wild salmon and an economic detriment to those industries that rely on wild salmon, such as the commercial fisheries, sports fisheries and eco-tourism.

Below are some of the many comments we received regarding economic impacts of the aquaculture industry, wild salmon sector and sports fisheries in coastal and isolated communities:

[5] Ministry of Agriculture and Lands. "2003 Quick Stats," *Fisheries Statistics*. Available online: www.agf.gov.bc.ca/fish_stats/aqua-shellfish.htm

The wild salmon economy is much more than a commercial fishing fleet and fish processors based at the mouth of the river, as important as those components are. It is the rich and diverse web of people and communities and the activities they undertake related to wild salmon, which span the watershed from the mouth of the river to the headwaters and all the tributaries that make up the entire watershed. It is First Nations people on the inland fishery along the river. It is angling guides and lodges. It is sport fishers, motels, campgrounds and bed-and-breakfasts. It is ecotourism operators who view grizzly bears dependent on healthy stocks of wild salmon. It is guides and outfitters who depend on healthy populations of bears, for example, for hunting. And it is the many levels of support and supply businesses — food, equipment, gas and other services — that support this economy. The wild salmon economy, however, would not exist without wild salmon ecology. You cannot have a healthy economy without healthy ecosystems. – Todd Stockner, Hazelton

These plants have a significant impact on the coastal communities in which they reside. It is not just the number of jobs they provide, but the type of jobs, that are important. Our industry provides a mixture of entry-level jobs; semi-skilled jobs, such as machine technicians and the like; and highly skilled jobs, such as computer programmers. This allows coastal communities to attract and retain a diverse population. – Don Millerd, Brown's Bay Packing, Vancouver hearing

Fish farms have thrived for many years and offered the employment that has been lacking in this area and allowed people to remain on the island. – Shirley Hickman, Port Hardy

We don't want to put additional risks...to an industry that we have now that employs shoreworkers and employs fishermen on the North Coast. – Joy Thorkelson, UFAWU, Prince Rupert hearing

When the commercial fishing industry shut down, people didn't know where to go. Some people knew what they could do to get into the fishing industry again. It took me till 1993, and I've been (in the aquaculture industry) since. I've been relying on this job because it's an all-year-round job. We have people coming in year after year, month by month, to work as steady-based workers. – John Lucas, Tofino hearing

A small fishing lodge like mine may produce over a million dollars' worth of revenue, but $900,000 of it comes right back into the community before taxes even come round. – Billy Blewett, Bella Coola hearing

THE ENVIRONMENTAL IMPACTS OF SALMON FARMING

Principles

All recommendations put forth by this committee take into account the 'Precautionary Principle' as we are dealing with a common public resource. The Precautionary Principle recognizes that the absence of full scientific certainty should not be used to delay actions or decisions when faced with threats of serious or irreversible harm. The Brundtland Report of the World Commission on Environment and Development defined sustainable development as follows: "Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their needs."[6]

Open-Net Pen Salmon Farms

The current practice for salmon farming in British Columbia is the use of what are commonly referred to as open-net pens. Each net pen can range in size, but are generally 30m by 30m in width. There are up to twelve pens per site, and a farm has the capacity to hold hundreds of thousands of fish. There are currently around 130 farm sites in British Columbia—60-80 of which are stocked at any given time.

The most concentrated area for salmon aquaculture operations in the province are the straits on the east coast of Vancouver Island from Campbell River to Port Hardy. In particular, the Broughton Archipelago and Discovery Islands are home to a large number of salmon farms.

Atlantic are the most common salmon species raised in British Columbia, accounting for 80 percent of the total output of farmed salmon, with chinook accounting for a majority of the remainder.[7]

Over the years, there have been many concerns raised about the impacts net-pen salmon farming has on the marine environment. Fish waste, salmon escapes, and predator deaths have all been identified by environmental organizations as problematic. The 1997 *Salmon Aquaculture Review* recommendations and subsequent Aquaculture Policy Framework sought to develop a regulatory regime that could remediate these areas of concern.

Stricter regulations coupled with advances in net-pen technology over the years have reduced the environmental footprint of salmon farming. When touring salmon farms near Tofino and Campbell River, we were shown some of these – including more efficient feeding techniques, increased predator netting, and more frequent diver inspections.

The framework agreement between CAAR and Marine Harvest Canada has also attempted to address some of the environmental impacts of certain salmon farming practices.

We received many submissions on the issue of open-net pen salmon farming throughout our inquiry. Below are a few of the comments:

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[6] World Commission on Environment and Development. *Our Common Future* (1987), p. 24.

[7] Ministry of Agriculture and Lands. "Average BC Salmon Aquaculture Harvest 2001-2004." Available online: www.agf.gov.bc.ca. Note: Coho and marine trout are also farmed in British Columbia.

As a biologist looking at the issue of salmon farming, this is the question that I feel is the most obvious: are these farms simply too big for this ecosystem? As far as the person-to-person reality of salmon farming, the reason these guys are in the predicament of costing the province and the federal government millions of dollars in research and repeated reviews is because the salmon farmers have been uncompromising. – Alexandra Morton, Sointula hearing

Salmon farming has made two large advancements in the past decades: Feed cameras, so we can guarantee no feed is getting through our net cages. Farm placement – farms are now placed in high tide flow areas, so feces can disperse and not pollute the bottom. – Peter Fussell, Black Creek

Impacts on wild salmon and their marine environment as a result of salmon farming in BC extend far beyond parasite infestations and escaped exotic fishes. Scientists have revealed the transfer of diseases from Atlantic salmon to wild Pacific salmon, aversions of marine mammals to regions where farms disperse high-amplitude sound and elevated mercury levels in rock fishes near farms. Many studies in Europe have also identified extensive nutrient and chemical contamination on benthic communities beneath farm pens. – Michael Price, Victoria

The existing open net cages place wild salmon at risk, discharge harmful chemicals into the marine environment, pollute shorelines and near shore areas with fish feces, cause the death of thousands of marine mammals and birds and have led to the escape of an alien species, namely, Atlantic salmon, which are now found in at least 80 watercourses in British Columbia and reproduce in some of them. – Burke Mountain Naturalists, Coquitlam

The "ticks" against aquaculture as currently practiced are numerous: pollution from fish waste, diseases and parasites generated by high concentrations of fish which leak out to wild fish, introduction of non-native species (in this case, Atlantic salmon) – an absolute ecological no-no, destroying other fish species to feed these monsters, and the harm done to both humans and wildlife by applying drugs, chemical additives and perhaps even hormones to farmed fish. – Mary Andrews, Victoria

Creating a Barrier

One of the suggestions for we heard frequently throughout the public consultation process was a call for the salmon farming industry to move to land-based closed containment farms. The argument followed that a move to land-based salmon farming would take salmon out of the marine environment and so eliminate the potential impacts such as fish waste, disease transfer, fish escapes, predator kills, and sea lice outbreaks.

We believe that it is possible for the salmon aquaculture industry to be ecologically sustainable, but only if policy decisions dictate that radical changes are made in salmon-farming practices. At the very centre of this change, there must be a conversion to safe closed containment systems. – Laurie MacBride, Georgia Strait Alliance

I do not disagree that fish farming is necessary, but I really think it needs to be contained on land, so that "oil spills" (metaphorically speaking) cannot affect large bodies of water. – Jennifer Scott, West Vancouver

I do not agree with open net salmon farming. I am very concerned it has a very negative impact on our wild salmon. I believe if we are to "farm" salmon then do it on land with large containers so there is not contamination with our wild stock. – Dianne Ackerman, Parksville

In discussing the feasibility of moving the industry to a land-based closed containment system, we heard from both industry and government officials. The message was that the costs of operating a commercial-scale land-based closed containment farm were significantly higher than the current open-net pen practice. Furthermore, we learned that such a move could also create a number of negative environmental impacts such as massive increases in energy consumption and waste disposal.

While other species are reared in land-based closed containment, including sockeye salmon, it is not practical for commercial-scale farming. In speaking with officials from other jurisdictions, we found there are no land-based commercial-scale closed containment Atlantic salmon farms currently in operation.

It is the opinion of people in my business that people who say they want to see the BC salmon aquaculture industry moved ashore, whether they know it or not, are really saying that they want the industry gone from BC – Wayne Gorrie, PRAqua, Nanaimo hearing

There were a number of land-based farms (in Europe) in the earlier years, but I think it has been proven expensive to keep them operating. I'm not aware of any large-scale closed containment or land-based farms in operation at the moment. – Dr. Patrick Gargon, Ireland

Committee Findings

While there is no consensus amongst the scientific community about the potential harm incurred by open-net pen technology, the overwhelming majority of scientists, as well as a preponderance of evidence, suggests that from a public policy point of view we must act, and act immediately. The Committee agrees that more study needs to be done, however we cannot wait for total consensus. We are the guardians and trustees of the environment and therefore cannot place at risk our wild salmon population nor the overall marine environment, both of which are still the envy of the world.

The Committee recognizes that land-based closed containment solutions are not feasible for farmed Atlantic and Chinook salmon. It is clear that the energy costs of commercial-scale aquaculture are neither economically feasible nor environmentally beneficial. The movement, oxygenation and controlled temperature of such a large volume of water on land makes little sense in a world where we are trying to reduce energy consumption. However, as noted, it is viable for higher-value species, and is already happening with sturgeon and sockeye salmon.

Ocean-Based Closed Containment

Ocean-based closed containment is defined as floating barrier technology that ensures no contact between wild and farmed fish, and minimal release of waste into the marine environment. Durability of the barrier is critical; this durability would exclude membrane technologies that have been in development.

This type of ocean-based closed containment is considered to be "flow-through". It allows for some exchange of micro organisms and waste between the farmed and marine environment. Although the ultimate goal in BC should be true ocean-based closed containment, a flow-through system would satisfy many of the concerns that British Columbians have expressed to the Committee to minimize the impact of farms on the marine environment.

It is our expectation that ocean-based closed containment technologies developed in BC will be licensed and sold around the world as consumers demand more sustainable aquaculture practices. This sustainable solution includes a barrier between farmed fish and the marine environment.

The Committee recommends that:

1.1 **A rapid, phased transition to ocean-based closed containment begin immediately. Within three years ocean-based closed containment must be developed. Once developed, industry must transition to this technology within the subsequent two years.**

1.2 **To meet the initial three year deadline, the provincial government, in partnership with the federal government and the salmon aquaculture industry, must urgently finance and conduct a full commercial-scale ocean-based closed containment project.**

1.3 **The provincial government should develop and provide incentives to the aquaculture industry to facilitate the transition to ocean-based closed containment technology.**

Supporting the Transition to Sustainable Aquaculture

Key investments are required to ensure a smooth transition to a sustainable aquaculture industry within the time frame set out in the report.

The Committee sets three goals for government, communities and the industry:

1. Effectively support the on-going technological innovations necessary to develop and maintain a sustainable aquaculture industry
2. Maintain the competitive advantage of BC's aquaculture industry
3. Take advantage of new competitive advantages flowing from BC's leadership role in achieving a sustainable aquaculture industry

To achieve these three goals the Committee recommends the provincial government develop a structure of investment and incentives in, but not limited, to the following areas:

Research and Development

- Initially focused on a pilot project for ocean-based closed containment systems but eventually to include feed, waste management and other aspects that impact sustainability
- Possible instruments include: Sustainable Aquaculture R&D fund, R&D tax credits, partnership in federal R&D strategies

Transition Costs

- Financial and regulatory incentives to support technology acquisition, training and other costs associated with the implementation of new sustainable aquaculture practices.
- Possible instruments include: pilot programs, tax credits, tax reduction (SST), Federal tax strategies (GST), training credits

Marketing

- Development of programs that expand BC aquaculture markets on the basis of new sustainable practices
  Possible instruments include: Market research programs, branding and marketing programs, regulatory support (organic/sustainable designation), Industry partnerships

North and Central Coast

The Committee also took the opportunity to travel to coastal and isolated communities where there were no salmon aquaculture operations. At the time of this report, no sites had been approved for the North Coast, although applications had been submitted. We traveled to the small island village of Kitkatla where the Chief and Council were optimistic about the potential for running a salmon aquaculture operation within Kitkatla traditional territory.

In Prince Rupert, we were met by a group consisting of various First Nations from around the region. We heard a strong message of opposition to salmon aquaculture expansion to the North Coast. As we travelled inland, we heard a similar message as we spoke with people in communities along the Skeena River who depend on wild salmon as a way of life.

As hereditary chief of the Nass River, I'm begging you: no fish farms, because I can see what it's going to do to our environment. – Chief M. Haines, Prince Rupert hearing

Whether it is being said in the tongues and the dialect of the Tsimshian, the Nisga'a, the Gitxsan, the Wet'suwet'en, the Haidas and the different dialects that are in each of those territories, "No to fish farms and protection of the wild stocks" is clearly understood by all nations, no matter what tongue. We understand that clearly. – Arnie Nagy, Prince Rupert hearing

I am talking about fish that are coming in the Skeena River. We have to protect it. We have to have a boundary of 200 miles, not just around our village. We have to protect. We don't want any farmed fish in our territory or in the mouth of the Skeena River. That's the place where we catch our fish. – Chief Barney Morgan, Hazelton hearing

On the Central Coast, we visited the village of Klemtu which has a small and successful salmon farm and processing operation.

We have done wonders since we got into partnership with Marine Harvest. Our young people are coming out and going shopping. They never used to do that before. They go to Port Hardy. Get lots of grub for their families and other things. Before that, they just relied on welfare, which we don't want. – Chief Archie Robinson Sr., Klemtu hearing

The success of the Klemtu salmon farming operations have raised concerns from neighbouring First Nations communities. The Special Committee travelled to the small community of Bella Bella, where we heard from Chiefs and Elders about the potential impacts of future aquaculture expansion in Klemtu might have on the marine environment.

The potential harm proposed by fish farms is a real and significant threat to the way of life for my people. The risk of harm from fish farm industry is not acceptable. For future generations, we are against fish farms in the Heiltsuk traditional territory. – William Gladstone, Bella Bella hearing

I am opposed to the expansion and continued use of net-cage (sea pen) aquaculture structures for finfish, particularly salmon species. Specifically, I am opposed to expansion of net-cage finfish aquaculture in the Central Coast Region, surrounding Bella Coola Valley. – Fraser Koroluk, Hagensborg

We recognize the concerns of the individuals who both spoke or wrote to us from the North and Central Coast, most of whom depend on wild salmon as a food source or a means to earn a living through commercial fishing and eco-tourism.

Committee Findings

While ocean-based closed containment technology is developed, we must exercise the Precautionary Principle in order to protect other regions of the BC coast from potential impacts of open net pen salmon farming. The Committee heard overwhelmingly from people in the north that the protection of the wild salmon is paramount. The majority of First Nations are vociferous in their opposition to the expansion of finfish farms in their territories. However, it must be acknowledged

that some First Nations have embraced aquaculture as a means to provide an income for their communities and to pull them out of poverty. The Committee's recommendations take all these issues into account.

The Committee recommends that:

2.1 There be no new finfish sites approved north of Cape Caution.

2.2 The existing Klemtu sites be grandfathered subject to negotiations between First Nations of the area and Marine Harvest.

2.3 In light of the recommended time referenced transition to ocean-based closed containment, any expansion in Klemtu, as elsewhere, must utilize ocean-based closed containment technology.

Siting and Monitoring

Current siting guidelines developed as a result of the *Salmon Aquaculture Review* and the Salmon Aquaculture Policy framework have been in place since March of 2000. These guidelines set out by the Ministry of Agriculture and Lands are for all future finfish farms on the coast of British Columbia, and are part of the criteria for new farm applications.

There are also a number of sites that have been identified through the Salmon Aquaculture Policy framework as requiring relocation. But as of 2005, only nine of the 37 poorly sited existing farms had been successfully relocated.[8]

Local and First Nations Involvement: Ecosystem-Based Management

During our inquiry, we heard evidence from First Nations suggesting that certain farm sites were placed in areas where traditional clam gathering beds existed. In some cases, we were informed that sites were chosen without the consent of the First Nations.

> *We also know that there have been little or no meaningful consultations with the First Nations prior to approving these sites in our territories by either the provincial or federal ministries responsible. We also know that there must be, by law, meaningful consultations and accommodations if our rights are affected. We see our rights are being affected.* – Chief Bill Cranmer, Alert Bay hearing

First Nations have cultural and historic knowledge of all the areas in which finfish aquaculture is carried out; the industry is being developed in their traditional territories and in waters where they have fishing rights. In the spirit of the New Relationship, First Nations must be involved in discussions about aquaculture development.

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[8] As of 2005, 10 proposed relocations have necessary provincial approvals and are awaiting completion of federal CEAA review. The remaining relocations have not been commenced, are no longer being considered for relocation, are on hold at the proponent's request, or are under review by Land and Water BC. Source: Ministry of Agriculture and Lands. *Salmon Aquaculture Resource Handbook*, 2005. The 2004/05 Auditor General of British Columbia Report 5: *Salmon Forever, An Assessment of the Provincial Role in Sustaining Wild Salmon*, October 2004, identified that the relocation of the 37 sites in recommendation 11: *the province take steps to resolve the aquaculture siting issue.*

The call for an ecosystem-based management approach to siting was raised and should be closely examined. This would incorporate ecological, social, and economic goals by using a multi-stakeholder approach to bring the cultural and traditional knowledge together with best available science.

> *The other thing that we do, in terms of what we call an ecosystem-based management approach to siting, is that the community is actually very involved in the siting of the farms. We tell Marine Harvest which areas they can go to. That really provides, I think, a whole history of traditional ecological knowledge of the area. They know which areas are not rich, not biodiverse. If it's a rich area, they're going to harvest food there, and they're not going to want to put a salmon farm there because they don't want to potentially risk that area.* – Larry Greba, Klemtu hearing

> *This landmark agreement based on credible science was the culmination of years of collaboration between First Nations, stakeholder groups and various industries. I think this model would work well in areas like Vancouver Island and the Broughton, where the salmon-farming industry and those opposed to it are here to stay.* – Renée Mikaloff, Victoria

> *Over the last couple of decades people who live in fishing communities have been recognized and well-appreciated by social scientists around the world as holders of local and traditional knowledge. It is only common sense that people who have lived with and depended on local resources have built up over centuries a body of ecological understanding.* – Dr. Marty Weinstein, Alert Bay hearing

Committee Findings

The issues of siting fish farms and the monitoring of their operations were raised frequently in both public hearings and submissions. There is a perception that all areas could be salmon migration routes which, if accepted unilaterally, would be very damaging for a healthy aquaculture industry. But it was clear from the hearings and submissions that many issues around siting could be alleviated with a vigorous, independent monitoring regime.

Monitoring must be sufficiently robust to ensure the aquaculture industry is not tarnished with allegations of poor practice. This must be addressed with adequate resources.

The balance of the issues around siting will be alleviated with the introduction of ocean-based closed containment. But expansion of the industry into new tenures must await implementation of technology for ocean-based closed containment.

The Committee Recommends that:

3.1 Once all of the existing sites have transitioned to ocean-based closed containment, the opportunity to expand to new sites with this technology can be considered with the following conditions:

3.1.1 Restoration of local governments and residents' right to approve the siting of new finfish sites.

3.1.2 Changes to the 'right to farm' legislation should be made accordingly – sections of the *Agriculture, Food and Fisheries Statutes Amendment Act, 2003. S.B.C. 2003, c.49* must be repealed.

3.1.3 Affected First Nations, local residents, local governments, regional districts, rural area representatives, town/village councils etc. must be fully involved in applications of aquaculture tenure siting. This should include early notification of applications, timely discussion and public hearings.

3.2 A "watchman" program should be established under which First Nations in whose territory fish farms are located are contracted to monitor farm sites for best practice.

3.2.1 Financial and physical capacity of the First Nations should be ensured.

3.3 Priority be placed within the provincial and federal governments for increased capacity for monitoring.

Fallowing of Sites

In the transition to ocean-based closed containment, all salmon farms should be stocked in a way that prevents conflict with the migratory patterns of vulnerable wild stocks.

The Committee notes that an effective precedent has already been set, on which British Columbia can build, to create such a monitoring, feedback and fallowing system. The framework agreement between the Coastal Alliance for Aquaculture Reform and Marine Harvest Canada points the way to further co-operation between all parties – including government.

The Committee recommends that:

3.4 Effective fallowing regimes similar to 2003's Broughton Archipelago Action Plan must be developed to protect juvenile salmon populations during migration periods.

3.5 Fallowing regimes for existing farms must be based on the Precautionary Principle, the best available science, and local and cultural knowledge in order to protect wild salmon.

3.5.1 By using this approach, the identified migratory routes should not have stocked adult fish in pens during times of migration.

3.6 Particular attention must be paid to safeguarding the migration of smolts in the Kingcome/Wakeman route.

Density

The Committee recognizes that a certain density of farms is required to maintain economic feasibility. However, the concentration of farms in the Broughton and the Discovery Islands puts migrating juvenile salmon at greater risk than other areas. The following recommendations are specific to these tenures for the transition period to ocean-based closed containment.

The Committee recommends that:

3.7 There be no increase in production levels per site or per tenure.

3.8 **Both the provincial and federal governments, industry, First Nations and non-profit organizations work together to build a stronger feedback monitoring regime in areas where there are key migration routes. Fallowing regimes must be constructed that monitor and control density and production intensity with the aim to control and limit mortality among migrating wild populations.**

Other Finfish Species

Very little research exists to demonstrate that aquaculture with either non-salmonids or genetically engineered salmonids is without risk to the environment or potential impact on commercial and sport fisheries. For example, sablefish represent a high-value wild fishery; juveniles spend their first two years in estuaries and along the inner coast before migrating to offshore banks where the fishery is active. The risk of impact from aquaculture on these juvenile populations must be minimized.

Recommendations 4.1 through 4.4 apply until such time as the transition to ocean-based closed containment technology has been completed.

The Committee recommends that:

4.1 **No new species of finfish should be introduced for ocean-based aquaculture**

4.2 **Production levels on active tenures with finfish species other than Atlantic and Chinook salmon (e.g. sablefish) must be frozen.**

4.3 **Inactive licenses to grow sablefish (including those within salmon tenures) must be suspended.**

4.4 **No additional finfish aquaculture tenures should be approved.**

4.5 **Government should ensure that the commercial farming of transgenic (genetically modified) salmon is prohibited, irrespective of containment technology.**

FINFISH - REGULATORY

Salmon aquaculture has a complex regulatory regime with many jurisdictional overlaps. Federally, Fisheries and Oceans Canada is the lead for aquaculture and is responsible for administering the *Fisheries Act*, the *Oceans Act*, the *Canadian Environmental Assessment Act*, the *Species at Risk Act*, as well as a habitat policy and an aquaculture policy framework.

Provincially, the lead agency for aquaculture is the Ministry of Agriculture and Lands (MAL). MAL is responsible for administering, issuing and renewing aquaculture licenses under the provincial *Fisheries Act*; evaluating site management plans and ensuring compliance; collection of facility reporting data; inspection of existing and proposed sites; and providing a fish health surveillance and auditing program.[9]

It should be noted that both Fisheries and Oceans Canada and MAL also have responsibility within their respective ministries for the promotion of the aquaculture industry.

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[9] Ministry of Agriculture and Lands. *Salmon Aquaculture Resource Handbook*, October 2005.

The provincial Ministry of Environment has regulatory authority under the *Waste Management Act* and the *Wildlife Act*, and responsibilities include aquaculture waste control regulation, field audits of company monitoring programs, and annual compliance monitoring reporting with MAL.

Municipal governments also play a role in aquaculture in terms of local land-use zoning.[10]

Inspections and audit of the salmon aquaculture sites are conducted by MAL on behalf of Ministry of Environment and integrated land management bureau. The MAL fisheries inspectors are responsible for issuing violation tickets, but if further action is required, than it is referred to MoE or Fisheries and Oceans Canada.[11]

Regulatory Review and Comparison with other Jurisdictions

In comparing BC's regulatory regime to other jurisdictions, the Committee spoke with government officials from Ireland and Iceland, as well as met with a group of coastal mayors from BC who had seen the aquaculture industry in Norway.

> *Mostly we depend upon the companies themselves, but the government officials can come into the farms at any time and do their own inspections. The company also must have a diary of everything that is going on — how much scope they are using, how many fish they are putting into their cages, how many they are taking out. If there are any major escapes, they must report them immediately and start fishing around their cages, trying to minimize the damage.* – Sigurdur Guðjónsson, Director, Institute of Freshwater Fisheries, Iceland

> *In Ireland we have strict regulation. We have a strict environmental impact assessment. There are environmental impact assessment criteria laid down by the European Union that each country has to abide by. There is a study undertaken, and every application has to do an environmental impact assessment. There's a whole series of criteria that have to be met, looking at local rivers, how close a farm might be to a river, important fisheries.*
>
> *If a licence is issued, it's issued with a lot of conditions. Some of them are that it will have staged increases in tonnage. If it's not meeting its requirements, such as lice regulation and other issues, it won't progress to the next staged increase of its licence.* – Dr. Patrick Gargan, Senior Fisheries Research Officer, Central Fisheries Board, Ireland

> *Taking back responsibilities from functions that were pushed outside of government and other downloads to other communities was an area that they've been very successful in Norway. They don't have all these other non-accountable, non-elected groups out there determining the path for industry, for communities.*
>
> *Also, they're linking the operators between communities and government through a regular form of communication, not just the permitting process. Communication seems to be an area that British Columbia is a lot weaker in than Norway. Aside from the 100-percent disclosure laws they have*

[10] Special Committee on Sustainable Aquaculture (SCSA). February 1, 2006 meeting – Ministry of Environment.
[11] SCSA. February 1, 2006 meeting – Ministry of Agriculture and Lands.

in Norway, we learn quite a bit from that exposure. – Patrick Marshall, Campbell River Economic Development Corporation

The Committee heard that in Norway there is a very active and healthy relationship between the aquaculture industry and the environmental non-governmental organizations (ENGOs). The Committee noted that this relationship is already developing in BC, through the Framework Agreement between Marine Harvest Canada and the Coastal Alliance for Aquaculture Reform. It is a sign of growing maturity in the salmon aquaculture industry when the largest industry player can work closely with an alliance of ENGOs.

Two regulatory comparisons are also being conducted in British Columbia:

- The Pacific Salmon Forum is currently conducting a comprehensive regulatory review of British Columbia's aquaculture sector. The Forum is anticipated to make regulatory recommendations by mid-2007.[12]
- Ministry of Agriculture and Lands have released a table that outlines the regulatory requirements on areas of escape prevention, farm siting, fish health, and waste management. The jurisdictional comparison reviews the regulations of Nova Scotia, Newfoundland, New Brunswick, Norway, Washington, Maine, Chile, and Scotland.[13]

Fish Health Management Plans

As a result of the *Salmon Aquaculture Review* and subsequent Aquaculture Policy, finfish farm operators are required to have a Fish Health Management Plan. The FHMP requires that, among other things, each farm site monitor and record mortalities, diseases, sea lice numbers and treatment.[14]

Although these fish health plans are required for each operation, the data is not required to be publicly accessible on a company-specific or site-specific basis. A fish health database—administered by the industry body, the British Columbia Salmon Farmers Association—reports quarterly on fish health data by region.

In speaking with scientists and government officials, we heard that this lack of accessible information on site specific fish health plans places limitations on their ability to conduct research.

Some kinds of data are awfully easy to provide. They don't take a lot of time — really basic, fundamental data like how many fish are on the farms, what were the numbers of lice recorded in

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[12] BC Pacific Salmon Forum. *BC Finfish Aquaculture Regulation: An Information Review and Progress Report*, January 2007.

[13] Ministry of Agriculture and Lands. "A Comparison of BC's Current Licensing and Regulatory Requirements with Other Jurisdictions." May 2005. Available online: www.agf.gov.bc.ca/fisheries/Finfish/cabinet/Summary_Table_BC-World_Aqua_Regs.pdf.

[14] Ministry of Agriculture and Lands. *Required elements of a Fish Health Management Plan for Public and Commercial Fish Culture Facilities in British Columbia*, June 2003, p. 3. Available online: www.agf.gov.bc.ca/AHC/fish_health/fhmp_Required_Elements_June-03.pdf.

the last audit. That doesn't take a lot of effort, and it would be tremendously valuable to people like us here in trying to do our work. – Dr. Rick Routledge, Simon Fraser University

One of the outcomes, as you've seen, is Marine Harvest posting their sea lice monitoring data. I wish the other companies would do likewise, because I think in this particular case that information is required under a provincial regulation, if I understand correctly. I haven't seen the industry clearly articulate why it needs to be proprietary. You have probably the largest company on this coast putting it up on their website. I think that would be beneficial and a good step forward. – Dario Stucci, Fisheries and Oceans Canada

We'd have no problem reporting as an individual company or having it sent out as an individual company. It would be fine. We've got nothing to hide. – Peter Gibson, Grieg Seafood

Committee Findings:

While BC claims to have the most stringent regulatory regime, there are key areas which must be addressed if BC is to further improve its reputation for having a healthy marine environment and a truly sustainable aquaculture industry.

The Committee recommends that:

5.1 There must be a clear division between Ministry of Agriculture and Lands and the Ministry of Environment. Programs that promote aquaculture development should be within the Ministry of Agriculture and Lands. All protection, regulation and monitoring of the aquaculture industry must be within the mandate of the Ministry of Environment.

5.2 Adequate resources should be distributed accordingly to ensure a robust compliance and enforcement regime is in place with adequate monitoring and feedback.

5.3 All fish health management plans must be made public, easily accessible on the Ministry's website, to increase transparency and to give greater confidence to British Columbians that all industry players are obeying best practice standards. This is already done voluntarily by some companies but we recommend that this should be mandatory.

5.4 Reporting can no longer rely on industry policing itself. The government as the regulator, must conduct random checks *without notice* to any fish farm operators.

5.5 The government must establish minimum fines that reflect the seriousness of the offences when infractions occur.

Sea Lice and Treatment

Sea lice are naturally occurring crustacean parasites common in temperate ocean waters. Marine fish, including salmon, act as hosts for sea lice, which attach themselves to a fish and feed off the mucous or skin. For salmon farmers, sea lice can pose a threat to the health of their stock. There are stringent sea lice monitoring procedures required and treatment measures in place for salmon farms in British Columbia.

The current practice to mitigate sea lice outbreaks is the usage of the chemical therapeutant Emamectin Benzoate (SLICE). In British Columbia the administering of SLICE is highly regulated under the Health Canada's Emergency Drug Release Program and can only be acquired through an application by a veterinarian. It is administered through fish feed pellets and the usage is triggered by regulation when a farm anticipates more than three or more motile lice per fish.[15] No other sea lice drug is currently being used in British Columbia, but other countries are using, or have used other methods (such as bath treatments) to mitigate sea lice.[16] However, SLICE is yet to be approved for sale in Canada, unlike other jurisdictions such as the EU, Norway, Chile, and the United States.[17]

Although SLICE has so far been seen by most experts as an effective and low-impact chemical to treat for sea lice outbreaks, there have been concerns brought forth to the Committee regarding the potential for resistance of the drug, accessing the drug, the lack of site specific information regarding sea lice outbreaks and SLICE usage, and the effects of SLICE on prawns and other crustaceans.

> *I mean, it's an insecticide. It's there to kill crustaceans. Prawns and crabs are crustaceans. It seems logical, and from my own catch and my logbook, I can show you it's having an effect.* – Guy Johnson, Sechelt hearing

The Ministry of Agriculture and Lands have released their Fish Health Program report which monitored among other things, sea lice levels and treatments from 2003-2005. The comprehensive report concluded that the industry has been in full compliance on usage of SLICE triggered by three motile lice.[18]

The Committee understands the necessity of controlling potential sea lice outbreaks and supports the continued strict usage of SLICE.

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[15] "In 2004, sea lice trigger levels were set at 3 motile lice from March 1 to July 1 and 6 for the remainder of the year. For 2005 those numbers were reduced to 3 motile lice year round." Ministry of Agriculture and Lands *Fish Health Program: 2003-2005*. p47

[16] Health Canada, Drugs and Health Products division. " Emamectin Benzoate (SLICE)." Available online: www.hc-sc.gc.ca/dhp-mps/vet/faq/faq_slice_e.html.

[17] Ibid.

[18] Ministry of Agriculture and Lands. *Fish Health Program: 2003-2005*. Available online: www.agf.gov.bc.ca/ahc/fish_health/FISH_HEALTH_03-05.pdf.

Committee Inquiry

During the public consultation process we heard that many people were concerned about the potential impact a salmon farm sea lice outbreak might pose to out-migrating juvenile salmon. At the time of our inquiry, a handful of peer-reviewed scientific articles had been published on the subject which suggested that there might be a link between sea lice on farms and the survival of out-migrating juvenile salmon.[19] This was in contrast to other peer-reviewed articles that found no link or focused on other potential causes for either sea lice hosts or pink salmon declines[20]

Science Panel

In light of scientific studies with apparently contradictory conclusions our Committee organized a panel which brought together a group consisting of academic, government and independent scientists to discuss a number of issues around the interaction between wild and farmed salmon.

The following topics were considered:

- Sea lice infection: What is the impact of sea lice on individual juvenile pink and chum salmon and do sea lice infections affect the growth rates or survival rates of juvenile pink and chum salmon?
- Salmon Farms: Do salmon farms contribute sea lice to the natural environment and are there other sources or causes o f sea lice and disease risks to wild populations?
- The Broughton Archipelago: Can wild and farmed salmon coexist in the Broughton Archipelago?
- Far field and ecosystem effects: What are ways that would mitigate against the effects of the organic waste discharge from open net cage aquaculture?

Discussions at the panel highlighted the continued lack of consensus on the issue of sea lice. It is clearly an area in which research and debate will both continue.

Current projects being funded by the Pacific Salmon Forum and British Columbia Aquaculture Research and Development Committee seek to determine the relationship between salmon farms and the wild stock. As well, CAAR and Marine Harvest have collaborated on sea lice studies stemming from their framework agreement. Other bodies, such as the BC Centre for Aquatic Health Sciences are also continuing research. We look forward to these findings in the coming months.

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[19] For example: Krkosek, M., Lewis, M. A., Morton A., Frazer, L. N. & Volpe, J. "Epizootics of wild fish induced by farm fish," proceedings of the National Academy of Sciences of the USA (2006).

[20] For example: Beamish, R.J., Neville, C.M., Sweeting, R.M., and Ambers, N.J. "Sea lice on adult Pacific salmon in the coastal waters of Central British Columbia, Canada," *Fisheries Research* 76 (2005): 198-208.

Committee Findings

The Committee recognizes that farmed salmon are by no means the only source of sea lice and disease transfer, but what happens in nature has been occurring for thousands of millennia. The introduction of a large new source of adult hosts in open net cages, at a time when juvenile wild salmon are migrating, is a man made change that we cannot ignore.

The experience from European countries points to the need for British Columbia to establish a management regime that does not rely solely on SLICE or other in-feed treatments.

The Committee recommends that:

5.6 **Government establish protocols which specifically refer to sea lice monitoring and control, including:**

- **Separation of generations (no smolts placed beside growers)**
- **Regular fallowing of farm sites**
- **Early harvest of two-sea-winter fish**
- **Adult fish should not be placed in the pens until smolts have traveled through the migratory areas**
- **Synchronous treatment of farms in the same geographic areas**
- **Consideration of tidal effects on disease transfer (e.g. the separation distance of farms and wild fish established according to tidal excursion distances, not randomly chosen distances).**

5.7 **Government continue its stringent action level of 3 motile lice (all stages) and introduce a measurement of 0.5 egg producing female lice throughout the year as is the best practice in Norway. We recognize that this will lead to the continued use of SLICE but want the industry to continue in their efforts to find alternative management techniques to mitigate the effects of sea lice.**

5.8 **That locally and strategically placed research centres such as the BC Centre for Aquatic Health Sciences be encou-aged to continue to examine fish health and possible solutions.**

Other Finfish-Related Issues

Net Treatments

Copper-based cuprous oxide latex net treatment is common in the finfish aquaculture industry in British Columbia as an effective antifoulant. Copper can be toxic at a concentration considerably higher than what is currently being used on the nets. Typically, nets are cleaned every year and are treated with antifoulants offsite by dipping them in a solution. We heard that up to 25,000 litres of antifoulant is used to treat the nets from one single farm each year.

> *We did a 100-by net, say, 25 metres deep — fairly beefy mesh. It's taking 1,800 litres to do that net. In a farm they could have ten 100-by holds there. Some 36-metre nets — ten of those, maybe 2,500 litres each.* – Doren Anderson, Campbell River Netloft Ltd.

However, a number of farm operators have opted not to use copper-based paint as an antifouling treatment on their nets.

The Committee recommends that:

5.9 During the transition to closed containment, the use of anti-fouling paint on nets must be prohibited to protect the marine habitat. We recommend that industry phase out the use of anti-fouling paint within one year.

Fish Feed and Labelling

Salmon, wild or farmed, has shown to be an excellent source of protein and omega-3 fatty acid. In the years ahead, the aquaculture industry will become the main supplier of seafood for the world as we see a decline in the world's wild seafood fisheries. A key to achieving a sustainable farmed salmon industry lies in the amount of fishmeal and fish oil it takes to produce farmed salmon. Fishmeal and fish oil are ingredients used in fish feed for farmed salmon.

During our inquiry we found that there was no clear agreement as to the conversion ratio of fishmeal or fish oil.[21] However, we believe that this proportion will continue to decrease to a level of sustainability as feed technology increases.

We also heard concerns regarding other additives used in farmed salmon feed, such as pigments to colour the flesh of the salmon and antibiotics as a fish health treatment. Although these have not proven to be harmful for human consumption, we found that there is little information on what is being added to the feed.

We believe that as regulators, the public should be confident that fishmeal and fish oil used in producing our farmed salmon is being sourced from sustainable harvested fisheries. We also believe that the public should be informed about any additives used in the farmed product.

The Committee recommends that:

5.10 Use of fishmeal and fish oil derived from wild sources must not exceed one pound of wild fish harvested for every pound of aquatic animals grown.

5.11 After the transition period to ocean-based closed containment, all fishmeal and fish oils used in BC must be harvested from independently verified sustainable sources. Much work has been done on this front and is based on the United Nations Food and Agriculture Organization's Code of Conduct for Responsible Fisheries. From this document, certification bodies such as the Marine Stewardship Council, KRAV, Naturland and others are developing sustainable fisheries harvesting standards.

5.12 The province must work with industry and the federal government to bring forward a new labelling regime to keep consumers better informed. This should include:

- **Mandatory labelling of contents of feed**

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[21] The British Columbia Salmon Farmers Association state that farmed salmon in BC consume only 1.1 pounds of feed for every pound they grow.http://www.salmonfarmers.org/files/publication_faqs.html. At public hearings and in written submissions, we were given higher numbers.

- **Mandatory labelling of additives in final product**
- **Mandatory labelling on final product as product of a fish farm**
- **Mandatory labelling on final product to distinguish open net-cage product from fish grown in closed containment, which should have a "BC eco-farmed salmon" type designation.**

5.13 The BC government should invest in a reinvigorated 'Buy BC' program that supports and markets products such as salmon and shellfish aquaculture goods.

Wild Salmon

Almost everyone who presented to the Committee, whether a worker in the aquaculture industry, a scientist, or an unaffiliated individual emphasized that protecting our wild salmon has to be paramount. Many submissions recognized that BC is blessed with a variety of species and quantity of salmon and it is incumbent on us to try to ensure that this natural resource is protected.

The Committee heard that the health, abundance and diversity of wild salmon remains the cultural underpinning of many communities. First Nations in particular have deeply held beliefs that their fate and the fate of wild salmon are inextricably linked.

Much of the salmon enhancement work and funding comes through the federal government to hatcheries. The aquaculture industry is also a frequent contributor to wild salmon enhancement projects as are community groups and First Nations. The provincial government has established a Living Rivers Trust Fund which provides financing to non-governmental organizations through grants.

> *We would be better served if all our money & efforts were invested into the improvement of our wild salmon (fish) stocks for the good health of our waters and all who eat sea food.* – Kathleen Henderson, Shawnigan Lake

> *Although it is unclear in our minds that sustainable aquaculture is a factor contributing to the decline in wild salmon stocks, any policies that you choose to effect that will provide support for the protection and rejuvenation of the wild salmon stock would be of much benefit to our area and greatly appreciated.* – Sean Ross, Campbell River

Ocean Ranching

The Committee heard from some witnesses about the salmon ranching approach to the industry used in Alaska and Japan. This relies heavily on intensive hatchery development and salmon release into the oceans. Control of the fishery is in the hands of the coastal communities and First Nations. Proponents of salmon ranching view it as an effective, community controlled wild fishery. Opponents see ocean ranching as another form of salmon farming with particular concerns related to genetic pollution of wild stocks.

> *In salmon farms, salmon are kept and raised in open-net pens in the ocean for most of their lives. In ocean ranching, the salmon are raised in hatcheries until they are big enough to survive, and*

then they are released into the wild. Ocean-ranching salmon look and behave exactly like wild salmon. Once they are released, they make their way out to the open ocean. After they mature, they want to come back to the stream where they were released from, in order to spawn. – Charles Justice, Prince Rupert hearing

As noted earlier, this Committee is taking the position of being precautionary and recommends that we do not risk doing further harm to an already damaged resource. We are also recommending concrete actions to rehabilitate wild stocks in the hope that future generations will still have choices to make about wild salmon.

The Committee recommends that:

6.1 **The Ministry of Environment take a lead role in creating a Living Rivers Strategy similar to the one proposed by the government in 2001 which promised to protect and improve BC's river systems with scientifically based standards for watershed management, enhancement to fish habitat, and a 10-year program to correct past damage.**

6.2 **Appropriate funding, measurable goals, targets and outcomes be put in place with an annual report by the Ministry of Environment on progress made.**

6.3 **Enhancement projects such as stream restorations be given a 250 metre clearance and guarantee that no development can take place so as to undo the work of salmon enhancement.**

6.4 **The provincial government urge Fisheries and Oceans Canada to commit to increasing its budget, staffing and support for fisheries enhancement and hatcheries.**

6.5 **More study be done by the Ministry of Agriculture, in conjunction with the Ministry of Environment and using the expertise of First Nations, on the salmon ranching industry to see if this form of aquaculture would be feasible in British Columbia.**

6.6 **The provincial government should establish Marine Protected Areas representing a minimum of five times the area licensed for aquaculture in each area. These MPA's must be in prime, representative habitat.**

Shellfish Aquaculture

While the initial intention of the Special Committee was to focus on the state of the salmon aquaculture industry in British Columbia, it soon became apparent that issues around the shellfish industry would have to be addressed.

The Committee received extensive input on shellfish aquaculture, both in public hearings and written submissions. Concerns were primarily focused on siting and the regulatory regime failing to address local concerns, release of debris, and other impacts on the environment. Several initiatives are recommended to promote growth of the industry, which the Committee believes has great potential to contribute much more significantly than at present to the coastal economy.

The Committee also spoke with industry experts and government officials on the current state of the shellfish industry as well as visited a scallop farm site and processing facility.

Below are a few of the comments we received regarding shellfish aquaculture in British Columbia:

> *There are issues with profitability and efficiency, but we basically have a lack of government support and vision for the industry. We have a lack of local government support, regional district zoning has made it nearly impossible, and investment and financing is not attracted to an industry that has this kind of (unjust) perception problem with the public.* – British Columbia Shellfish Growers Association, Campbell River hearing

> *The problem with scallop farming is that the regulations are based on farming techniques that are 25 years old — for example, mussel farms in Prince Edward Island.* – Bob Saunders, Island Scallops Ltd, Nanaimo hearing

> *I guess my big question to you guys is: how can you not totally support an environmentally friendly, socially acceptable, labour-intensive new industry in an area of high, chronic unemployment? There are other fish in the sea, and First Nations shellfish industry is a win-win scenario.* – Bill Mounce, Terrace hearing

The Committee recommends that:

Siting

7.1 The provincial government should designate coastline where shellfish farms can be sited that minimize competition with residential and recreational use. These areas should be close enough to transportation links and energy supplies that are needed for a processing plant.

7.2 Notwithstanding 7.1, municipalities/regional governments and First Nations must have the authority to approve siting of tenures.

7.3 Industrial-scale operations should have clear siting criteria policy to ensure there are adequate buffers from residential/recreational properties. Industrial scale operations are those which regularly use machinery or large-scale structures.

7.4 Operations must not interfere with navigation in the waterways they occupy or make the coastline inaccessible or inhospitable to recreational boaters, swimmers, or pedestrians.

Regulation

7.5 No new species are to be approved for commercial aquaculture without a consensus of independent peer-reviewed science demonstrating that the potential impact on the marine environment is minimal.

7.6 Recently approved geoduck clam tenures must be rescinded until conditions in Recommendation 7.5 are met.

7.7 A Code of Practice must be developed and implemented that respects the interests of other coastal stakeholders, including First Nations, residential communities, small shellfish operators, tourism and other businesses, and recreational users.

7.8 The Ministry of Environment must increase enforcement to eliminate release of debris from shellfish operations.

7.9 All shellfish operations must submit an annual inventory of plastics and Styrofoam used on farm, and report any loss of such material/equipment to the ministry responsible within 30 days.

7.10 The government should work with growers to reduce overall use of plastics, Styrofoam and other equipment/materials with known toxins (such as treated wood).

7.11 Enforcement must take place to ensure that underwater nets around suspended strings which violate HADD (Harmful Alteration, Disruption or Destruction of fish habitat) under the Federal Fisheries Act are not in use.

7.12 Efforts should be made to simplify the regulatory burden for smaller growers.

7.13 A liaison should be established within the Ministry of Agriculture and Lands to assist First Nations and potential industry partners to set up commercial joint ventures.

7.14 Shellfish testing facilities must be financed by the Ministry of Environment on the North Coast and other suitable regions, (as was done on the South Coast) so that the shellfish aquaculture industry can better serve that area.

SUMMARY OF RECOMMENDATIONS

Principles

All recommendations put forth by this committee take into account the 'Precautionary Principle' as we are dealing with a common public resource. The Precautionary Principle recognizes that the absence of full scientific certainty should not be used to delay actions or decisions when faced with threats of serious or irreversible harm.

Further, these recommendations are framed with the principles and vision of the New Relationship. First Nations, in whose traditional territory work is being conducted must be fully involved in decision making and provided with the capacity to do so.

1. Finfish Recommendations

1.1 A rapid, phased transition to ocean-based closed containment begin immediately. Within three years ocean-based closed containment must be developed. Once developed, industry must transition to this technology within the subsequent two years.

1.2 To meet the initial three year deadline, the provincial government, in partnership with the federal government and the salmon aquaculture industry, must urgently finance and conduct a full commercial scale ocean-based closed containment project.

1.3 The provincial government should develop and provide incentives to the aquaculture industry to facilitate the transition to ocean-based closed containment technology.

2. North and Central Coast

2.1 There be no new finfish sites approved north of Cape Caution.

2.2 The existing Klemtu sites be grandfathered subject to negotiations between First Nations of the area and Marine Harvest.

2.3 In light of the recommended time referenced transition to ocean-based closed containment, any expansion in Klemtu, as elsewhere, must utilize ocean-based closed containment technology.

3. Siting and Monitoring

Expansion and Monitoring

3.1 Once all of the existing sites have transitioned to ocean-based closed containment, the opportunity to expand to new sites with this technology can be considered with the following conditions:

3.1.1 Restoration of local governments and residents' right to approve the siting of new finfish sites.

3.1.2 Changes to the 'right to farm' legislation should be made accordingly – sections of the *Agriculture, Food and Fisheries Statutes Amendment Act,2003 S.B.C. 2003, c.49* must be repealed.

3.1.3 Affected First Nations, local residents, local governments, regional districts, rural area representatives, town/village councils etc. must be fully involved in applications of aquaculture tenure siting. This should include early notification of applications, timely discussion and public hearings.

3.2 A "watchman" program should be established under which First Nations in whose territory fish farms are located are contracted to monitor farm sites for best practice.

3.2.1 Financial and physical capacity of the First Nations should be ensured.

3.3 Priority be placed within the provincial and federal governments for increased capacity for monitoring.

Fallowing

3.4 Effective fallowing regimes similar to 2003's Broughton Archipelago Action Plan must be developed to protect juvenile salmon populations during migration periods.

3.5 Fallowing regimes for existing farms must be based on the Precautionary Principle, the best available science, local and cultural knowledge in order to protect wild salmon.

3.5.1 By using this approach, the identified migratory routes should not have stocked adult fish in pens during times of migration.

3.6 Particular attention must be paid to safeguarding the migration of smolts in the Kingcome/Wakeman route of the Broughton Archipelago.

Density

3.7 There must be no increase in production levels per site or per tenure.

3.8 Both levels of government, industry, First Nations, and non-profit organizations must work together to build a stronger feedback monitoring regime in areas like the Broughton and Discovery Islands with a high density of operations. Fallowing regimes must be constructed that monitor and control density and production intensity with the aim to control and limit mortality among migrating wild populations.

4. Other finfish species

Recommendations 4.1 through 4.4 apply until such time as the transition to ocean-based closed containment technology has been completed.

4.1 No new species of finfish should be introduced for ocean-based aquaculture in existing tenures.

4.2 Production levels on active tenures with finfish species other than Atlantic and Chinook salmon (eg. sablefish) must be frozen.

4.3 Inactive licenses to grow sablefish (including those within salmon tenures) must be suspended.

4.4 No additional finfish aquaculture tenures should be approved.

4.5 Government should ensure that the commercial farming of transgenic (genetically modified) salmon is prohibited, irrespective of containment technology.

5. Finfish - Regulatory

Accountability and Enforcement

5.1 There must be a clear division between Ministry of Agriculture and Lands and the Ministry of Environment. Programs that promote aquaculture development should be within the Ministry of Agriculture and Lands. All protection, regulation and monitoring of the aquaculture industry must be within the mandate of the Ministry of Environment.

5.2 Adequate resources should be distributed accordingly to ensure a robust compliance and enforcement regime is in place with adequate monitoring and feedback.

5.3 All fish health management plans must be made public, easily accessible on the Ministry's website, to increase transparency and to give greater confidence to British Columbians that all industry players are obeying best practice standards. This is already done voluntarily by some companies but we recommend that this should be mandatory.

5.4 Reporting can no longer rely on industry policing itself. The government as the regulator, must conduct random checks *without notice* to any fish farm operators.

5.5 The government must establish minimum fines that reflect the seriousness of the offences when infractions occur.

Sea Lice

5.6. Establish protocols which specifically refer to sea lice monitoring and control, including:

- Separation of generations (no smolts placed beside growers)
- Regular fallowing of farm sites
- Early harvest of two-sea-winter fish
- Adult fish should not be placed in the pens until smolts have traveled through the migratory areas
- Synchronous treatment of farms in the same geographic areas
- Consideration of tidal effects on disease transfer (e.g. the separation distance of farms and wild fish established according to tidal excursion distances, not randomly-chosen distances).

5.7 Government continue its stringent action level of 3 motile lice (all stages) and introduce a measurement of 0.5 egg producing female lice throughout the year as is the best practice in Norway. We recognize that this will lead to the continued use of SLICE but want the industry to continue in their efforts to find alternative management techniques to mitigate the effects of sea lice.

5.8 Locally and strategically placed research centres such as the BC Centre for Aquatic Health Sciences be encouraged to continue to examine fish health and possible solutions.

General

5.9 During the transition to ocean-based closed containment, the use of anti-fouling paint on nets must be prohibited to protect the marine habitat. We recommend that industry phase out the use of anti-fouling paint within one year.

5.10 Use of fish meal and fish oil derived from wild sources must not exceed one pound of wild fish harvested for every pound of aquatic animals grown.

5.11 After the transition period to ocean-based closed containment, all fish meal and fish oils used in BC must be harvested from independently verified sustainable sources. Much work has been done on this front and is based on the United Nations Food and Agriculture Organization's Code of Conduct for Responsible Fisheries. From

this document, certification bodies such as the Marine Stewardship Council, KRAV, Naturland and others are developing sustainable fisheries harvesting standards.

5.12 The province must work with industry and the federal government to bring forward a new labelling regime to keep consumers better informed. This should include:

- Mandatory labelling of contents of feed
- Mandatory labelling of additives in final product
- Mandatory labelling on final product as product of a fish farm
- Mandatory labelling on final product to distinguish open net-cage product from fish grown in closed containment, which should have a "BC eco-farmed salmon" type designation.

5.13 The BC government should invest in a reinvigorated 'Buy BC' program that supports and markets products such as salmon and shellfish aquaculture goods.

6. Wild Salmon

6.1 The Ministry of Environment take a lead role in creating a Living Rivers Strategy similar to the one proposed by the government in 2001 which promised to protect and improve BC's river systems with scientifically based standards for watershed management, enhancement to fish habitat, and a 10-year program to correct past damage.

6.2 Appropriate funding, measurable goals, targets and outcomes be put in place with an annual report by the Ministry of Environment on progress made.

6.3 Enhancement projects such as stream restorations be given a 250 metre clearance and guarantee that no development can take place so as to undo the work of salmon enhancement.

6.4 The provincial government urge Fisheries and Oceans Canada to commit to increasing its budget, staffing and support for fisheries enhancement and hatcheries.

6.5 More study be done by the Ministry of Agriculture and Lands, in conjunction with the Ministry of Environment and using the expertise of First Nations, on the salmon ranching industry to see if this form of aquaculture would be feasible in British Columbia.

6.6 The provincial government should establish Marine Protected Areas representing a minimum of five times the area licensed for aquaculture in each area. These MPA's must be in prime, representative habitat.

7. Shellfish Recommendations

Siting

7.1 The provincial government should designate coastline where shellfish farms can be sited that minimize competition with residential and recreational use. These areas should be close enough to transportation links and energy supplies that are needed for a processing plant.

7.2 Notwithstanding 7.1, municipalities/regional governments and First Nations must have the authority to approve siting of tenures.

7.3 Industrial-scale operations should have clear siting criteria policy to ensure there are adequate buffers from residential/recreational properties. Industrial scale operations are those which regularly use machinery and large-scale structures.

7.4 Operations must not interfere with navigation in the waterways they occupy or make the coastline inaccessible or inhospitable to recreational boaters, swimmers, or pedestrians.

Regulation

7.5 No new species are to be approved for commercial aquaculture without a consensus of independent peer-reviewed science affirming that the potential impact on the marine environment is minimal.

7.6 Recently approved geoduck clam tenures must be rescinded until conditions in Recommendation 7.5 are met.

7.7 A Code of Practice must be developed and implemented that respects the interests of other coastal stakeholders, including First Nations, residential communities, small shellfish operators, tourism and other businesses, and recreational users.

7.8 Ministry of Environment must increase enforcement to eliminate release of debris from shellfish operations.

7.9 All shellfish operations must submit an annual inventory of plastics and Styrofoam used on farm, and report any loss of such material/equipment to the ministry responsible within 30 days.

7.10 The government should work with growers to reduce overall use of plastics, Styrofoam and other equipment/materials with known toxins (such as treated wood).

7.11 Enforcement must take place to ensure that underwater nets around suspended strings which violate HADD (Harmful Alteration, Disruption or Destruction of fish habitat) under the federal *Fisheries Act* are not in use.

7.12 Efforts should be made to simplify the regulatory burden for smaller growers.

7.13 A liaison should be established within the Ministry of Agriculture and Lands to assist First Nations and potential industry partners to set up commercial joint ventures.

7.14 Shellfish testing facilities must be financed by the Ministry of Environment on the North Coast and other suitable regions, (as was done on the South Coast) so that the shellfish aquaculture industry can better serve that area.

APPENDIX A: WITNESS BRIEFINGS

As a key component of the mandate of the Committee, senior government officials, academics, scientists, as well as industry and environmental associations were invited to provide testimony on issues identified in the SCSA terms of reference.

1. Overview by government officials on the various ministries and entities involved with aquaculture in British Columbia. (February 1, 2006; April 16, 2006)

The committee met with senior officials to discuss the various policies and procedures of different government organizations that manage aspects of aquaculture in the province.

The provincial ministries of Agriculture and Lands, and Environment, and the federal Department of Fisheries and Oceans reviewed their respective and shared responsibilities as outlined in the *Fisheries Act*, the *Oceans Act*, the *Canadian Environmental Assessment Act*, the *Species at Risk Act*, the Salmon Aquaculture Policy Framework, and the *Environmental Management Act*.

Other issues raised at this initial briefing were: the salmon farm license application process; monitoring and auditing of farm sites; inspections; compliance and enforcement measures; and monitoring of waste generated by the fish farm industry.

2. The aquaculture regulatory regime in British Columbia—historical overview, current trends, and jurisdictional comparisons. (June 1, 2006)

The Committee met with government officials to review changes to the aquaculture regulatory regime that had occurred since the Salmon Aquaculture Review was conducted in the mid-nineties.

The provincial ministries of Agriculture and Lands and Environment provided an update on the implementation process of the SAR recommendations—including specific initiatives in farm salmon escape prevention, farm fish health, farm siting, farm application approvals, and waste management. The officials also briefly drew comparisons of BC's regulations to Norway, Chile, Scotland, New Brunswick, Nova Scotia, Newfoundland, Maine and Washington.

The federal Department of Fisheries and Oceans provided an overview of the changes to the regulatory regime since the 1980s, including the review role of environmental assessment, First Nation consultation, habitat review, the operational role of farm stock licensing, and habitat compensation and monitoring. The DFO official also drew comparisons of how the Atlantic and Pacific regions applied the federal CEAA and habitat legislation.

3. The role of the Chair in Sustainable Aquaculture and the Centre for Aquaculture and Environmental Research (June 1, 2006)

The committee met with the Chair in Sustainable Aquaculture at the DFO/UBC Centre of Aquaculture and Environmental Research (CAER), who discussed the history, vision and activities of the centre and the Chair's role. The Committee heard that the CAER science activities include sustainable aquaculture research, sustainable natural fisheries research, and aquaculture impacts on natural resources.

4. Application process for aquaculture site (November 15, 2006)

A representative from Grieg Seafood BC Ltd, a company that recently had a post-moratorium farm site approved, provided a detailed overview of the changes to the site application process since the Salmon Aquaculture Review. The members were briefed about the provincial, federal and regional requirements of the application process.

5. Overview of Department of Fisheries and Oceans 2006 (November 30, 2006)

The Committee again met officials from the Department of Fisheries and Oceans Canada to be briefed on their recent research related to sustainable aquaculture in British Columbia. Topics covered were fish health research, DEPOMOD and near field interactions, far-field and ecosystem interactions, sea lice, and the DFO management regime.

6. Association briefings, (December 1, 2006)

6.1 The British Columbia Salmon Farmers Association

The Committee met with the board of the BCSFA who briefed the members on the state of the salmon aquaculture industry in the province. The witnesses discussed their regulatory compliance, economic contribution and product produced by the fish farming industry in British Columbia. It also sought to clarify some previous negative assessments of fish farms with regard to feeding practices, escapements, fish waste, sea lice, and closed containment during the course of the public hearing process.

6.2 Coastal Alliance for Aquaculture Reform

Members of the Coastal Alliance for Aquaculture Reform provided briefings on the various research their organizations have compiled in relation to sustainable aquaculture. Topics of discussion included closed containment technology; sea lice in the Broughton Archipelago; farm siting; fish escapes; global fish stocks; ecological fiscal reform of the aquaculture industry; and the effects of farm waste on traditionally clam-gathering beds in the Broughton Archipelago.

7. Science Panel Discussion (December 5, 2006)

During the course of the Committee's mandate, a number of peer-reviewed scientific articles were published on issues pertaining to the SCSA's terms of reference. The most recent studies by different scientists looking at sea lice infestations in the Broughton Archipelago appeared to draw contrasting conclusions on whether there was a real threat to wild salmon by fish farms in migratory routes.

The Committee invited a panel of seven scientists who had recently published peer-reviewed articles on this issue to discuss their findings. The following topics were considered:

- Sea lice infection: What is the impact of sea lice on individual juvenile pink and chum salmon and do sea lice infections affect the growth rates or survival rates of juvenile pink and chum salmon?
- Salmon Farms: Do salmon farms contribute sea lice to the natural environment and are there other sources or causes o f sea lice and disease risks to wild populations?

- The Broughton Archipelago: Can wild and farmed salmon coexist in the Broughton Archipelago?
- Far field and ecosystem effects: What are ways that would mitigate against the effects of the organic waste discharge from open net cage aquaculture?

8. Briefings from International Scientists (January 29, 2007)

The Committee met on January 29, 2007 to hear briefings from three scientists: a researcher in fisheries and marine conservation in Nova Scotia; the Director of the Institute of Freshwater Fisheries in Iceland; and senior research officer with the Central Fisheries Board in Dublin.

The purpose of this meeting was to provide the members with some comparative information from eastern Canada and Europe on a variety of aquaculture-related issues.

Issues discussed included the regulatory regime in Europe, closed containment projects, the use of SLICE, the Precautionary Principle, and salmon escapes.

9. Sablefish briefing (February 16, 2007)

The Special Committee on Sustainable Aquaculture met on February 16, 2007 to hear a briefing from the Canadian Sablefish Association regarding the impact of sablefish and salmon farming on the wild sablefish fishery.

The Canadian Sablefish Association wanted to provide the Committee with the results of its most recent research on the dynamics and movement of sablefish in BC mainland inlets. The objectives of the research were to compare trends in abundance among the four mainland inlets that have been closed to fishing since 1994, and to determine the percent of tagged sablefish that moved from the mainland inlets to the BC offshore fishing grounds between 1995 and 2005.

10. Geoduck briefing (February 19, 2006)

The Committee met on February 19, 2007 to hear briefings on the matter of geoducks from the Ministry of Agriculture and Lands, the Department of Fisheries and Oceans, and the Underwater Harvesters Association.

The Committee was presented with an outline of the development of geoduck aquaculture in British Columbia from 1990 to the present—including information on current research and current plans for commercial harvesting.

11. British Columbia Aquaculture Research and Development Committee/ Malaspina University College Centre for Shellfish Reasearch (March 2, 2007)

The Committee met with members of the BC Research and Development Committee and who discussed past and current research initiatives funded through the Aquaculture E-Fund.

Research has been conducted in the areas of benthic impacts of finfish aquaculture; fish disease interactions; fish processing waste/bloodwater management; fish parasite interactions; and, shellfish particulate cycling and ecological interactions.

The Committee also heard from a researcher from Malaspina University College Centre for Shellfish Research, whose recent project looked at the potential environmental impacts of bivalve aquaculture on the sea floor and on the biodiversity of the area.

12. British Columbia Coastal Mayors Briefing on Norway fact-finding trip (March12, 2007)

A group of coastal mayors met with the Committee to discuss their aquaculture trip to Norway in the fall of 2006. The mayors discussed a number of programs that existed in Norway that could make aquaculture more sustainable in British Columbia, as well as increase the viability of their small towns.

These included an educational institute that specialized in aquaculture-related activities from both the wild and farm fishery – including veterinary services, processing, fish mongering, and culinary arts; collaborative eco-based management of the aquaculture industry; increased communication that have programs that link companies and communities and disclosure laws in place for transparency; and non-site specific licensing flexibility for farm sites.

Transcripts of all public meetings can be found on the Committee's website at: www.leg.bc.ca/cmt/aquaculture. Audio webcasts of committee meetings are also available on the website.

Appendix B: Briefings Witness List

February 1, 2006

- Ministry of Agriculture and Lands:

Al Castledine, Director, Aquaculture Development
Jaclynn Hunter, Director, Fisheries and Aquaculture Licensing and Compliance
Joanne Constantine, Fish Health Veterinarian

- Ministry of Environment:

Eric McGreer, Senior Aquaculture Biologist, Vancouver Island Region
Randy Alexander, Regional Environmental Protection Manager, Vancouver Island Region
Lynn Bailey, Director, Regional Operations, Environmental Protection Division

- Fisheries and Oceans Canada:

Paul Sprout, Regional Director General
Andrew Thomson, A/Director, Aquaculture Division
Laura Richards, Regional Director, Science
Donna Martin, Strategic Media Relations

April 25, 2006

- Ministry of Environment:

Bud Graham, Assistant Deputy Minister, Oceans and Marine Fisheries Division

June 1, 2006

- Fisheries and Oceans Canada:

Andrew Thomson, A/Director, Aquaculture Division

- British Columbia Ministry of Agriculture and Lands:

Al Castledine, Director, Aquaculture Development
Jaclynn Hunter, Director, Fisheries and Aquaculture Licensing and Compliance
Larry Pedersen, Deputy Minister
Kathy Evans, Section Head, Licensing Unit, Fisheries and Aquaculture Licensing and Compliance
Daphne Stancil, Assistant Deputy Minister, Strategy, Policy and Legislation Division
Yves Antaya, Section Head, Compliance and Monitoring Unit, Aquaculture Licensing and Compliance
Gavin Last, Manager, Finfish Development

- Ministry of Environment:

Randy Alexander, Regional Manager, Environmental Protection Division
Chris Trumpy, Deputy Minister
Bud Graham, Assistant Deputy Minister, Oceans & Marine Fisheries Division

- University of British Columbia:

Dr. Anthony P. Farrell, Chair in Sustainable Aquaculture at the DFO UBC Centre for Aquaculture and Environmental Research

November 15, 2006

Tim Davies, Grieg Seafood BC Ltd.

November 30, 2006

- Fisheries and Oceans Canada:

Ted Perry, Marine Ecosystems and Aquaculture Division
Dr. Brian Riddell, Salmon and Freshwater Ecosystems Division
Dario Stucchi, Ocean Sciences Division
Dr. Terri Sutherland, Marine Ecosystems and Aquaculture Division
Dr. Simon Jones, Marine Ecosystems and Aquaculture Division
Dr. Brent Hargreaves, Salmon and Freshwater Ecosystems Division
Andrew Thomson, A/Director, Aquaculture Division

December 1, 2006

- British Columbia Salmon Farmers Association:

Mary Ellen Walling, Executive Director, BC Salmon Farmers Association
Brad Hicks, Taplow Feeds
Odd Grydeland, Odd Grydeland Consulting, Division of Namsos Invest Ltd.
Justin Henry, Target Marine Products LLP
Ross Grierson, EWOS Canada Ltd.
Dale Blackburn, Marine Harvest Canada
Keith Bullough, Pan Fish Canada
Greg Deacon, Skretting Canada
Chief Moses Martin, Tla-o-qui-aht First Nation

- Coastal Alliance for Aquaculture Reform:

Catherine Stewart, Living Oceans Society
Dr. Craig Orr, Watershed Watch Salmon Society
Robert Mountain, Musgamagw Tsawataineuk Tribal Council
Jay Ritchlin, David Suzuki Foundation
Gerry Thorne, Georgia Strait Alliance
David Lane, T. Buck Suzuki Environmental Foundation

December 5, 2006

Dr. Richard Beamish, Pacific Biological Station, Fisheries and Oceans Canada
Dr. Simon Jones, Marine Ecosystems and Aquaculture Division, Fisheries and Oceans Canada
Dario Stucchi, Institute of Ocean Sciences, Fisheries and Oceans Canada
Dr. Rick Routledge, Department of Statistics and Actuarial Science, Simon Fraser University
Alexadra Morton, Raincoast Research
Martin Krkosek, Department of Biological Sciences, University of Alberta
Dr. Kenneth M. Brooks, Aquatic Environmental Sciences

January 29, 2007

Jennifer Ford, Dalhousie University
Dr. Patrick Gargan, Central Fisheries Board, Ireland
Dr. Sigurður Guðjónsson, Director, Institute of Freshwater Fisheries, Iceland
Dr. Craig Orr, Executive Director, Watershed Watch Salmon Society

February 16, 2007

- Canadian Sablefish Association:

Chris Acheson, President
Mark Baggio
Leslie Budden
Sean Cox
Tim Joys
Ron MacDonald
Eric Wickham

February 19, 2007

Al Castledine, Director, Aquaculture Development, Ministry of Agriculture and Lands
Andrew Thomson, A/Director, Aquaculture Management, Fisheries and Oceans Canada
Dr. Chris Pearce, Research Scientist, Aquaculture Division, Fisheries and Oceans Canada
James Austin, Underwater Harvesters' Association
Michelle James, Underwater Harvesters' Association
Bruce Clapp, Underwater Harvesters' Association

March 2, 2007

Dr. Penny Barnes, Centre for Shellfish Research, Malaspina University College
Dr. Tim DeJager, British Columbia Aquaculture Research and Development Committee
Sam Nakai, British Columbia Aquaculture Research and Development Committee
Dr. Bill Pennell, British Columbia Aquaculture Research and Development Committee
Don Tillapaugh, Centre for Shellfish Research, Malaspina University College

March 12, 2007

Mayor Larry Pepper, Village of Port Alice
Mayor Dave McIntosh, Village of Tahsis
Mayor John Fraser, District of Tofino
Mayor Hank Bood, District of Port Hardy
Mayor Craig Anderson, Village of Gold River
Patrick Marshall, General Manager & EDO of Campbell River EDC Rivercorp

APPENDIX C: WITNESS LIST

Aboriginal Aquaculture Association, Richard Harry, Moses Martin, Alvin Sewid, Ted Williams, 19-Oct-06 (Victoria)
Dave Adams, 28-Jun-06 (Port Hardy)
Agrimarine Industry Inc., Richard Buchanan, 18-Oct-06 (Vancouver)
AKVAsmart, Laurie Jensen, 28-Jun-06 (Port Hardy)
Pat Alfred, 26-Jun-06 (Alert Bay)
Alpha Processing, Letsie Blackmore, 28-Jun-06 (Port Hardy)
Association for Responsible Shellfish Farming, Denise Reinhardt, 18-Oct-06 (Vancouver)
Mark Ayranto, 19-Jun-06 (Kitkatla)
BC Nature, Anne Murray, Bev Ramey, 18-Oct-06 (Vancouver)
Taylor Bachrach, 06-Oct-06 (Smithers)
Dr. Jennifer Balke, 11-Oct-06 (Campbell River)
BC Centre for Aquatic Health Sciences, Dr. Valerie Funk, Dr. Sonja Saksida, 19-Oct-06 (Victoria)
BC Salmon Farmers Association, Dale Blackburn, Keith Bullough, Greg Deacon, Ross Grierson, Odd Grydeland, Justin Henry, Brad Hicks, Mary Ellen Walling, 01-Dec-06 (Vancouver)
Poul Bech, 06-Oct-06 (Smithers)
Lynne Belfry, 27-Jun-06 (Sointula)
Bella Coola Valley Seafoods, Ed Willson Jr., 05-Oct-06 (Bella Coola)
Rina Berkshire, 11-Oct-06 (Campbell River)
Ray Blake, 21-Jun-06 (Kitwanga)
Blue Bytes Computer Services, Riccardo Marrara, 28-Jun-06 (Port Hardy)
Bold Point Centre for Tourism Training, Rod Burns, 07-Jun-06 (Campbell River)
Dr. Jim Brackett, 05-Jun-06 (Nanaimo)
Kate Brauer, 27-Jun-06 (Sointula)
British Columbia Chamber of Commerce, Jon Garson, John Winter, 24-Nov-06 (Vancouver)
British Columbia Shellfish Growers Association, Roberta Stevenson, 07-Jun-06 (Campbell River)
Broughton Archipelago Stewardship Society, Susie Jirik, Kate Pinsonneault, 27-Jun-06 (Sointula)
Broughton Archipelago Stewardship Society, 27-Jun-06 (Sointula)
Jeff Brown, 05-Oct-06 (Bella Bella)
Susan Brown, 05-Oct-06 (Bella Bella)
Brown's Bay Packing Company, Ed Brennan, Richard Brown, Corine Buse, Ron Coyle, Janet DeCraene, Dave Fowler, Sheryl Kruse, Kelly MacDonald, Bruce Nicolaye, Jamie Prodaehl, David Stover, Scott Williams, 11-Oct-06 (Campbell River)
Leanne Brunt, 28-Jun-06 (Port Hardy)
Steven Robert Brunt, 11-Oct-06 (Campbell River)
Carmen Burrows, 27-Jun-06 (Sointula)
Barry Bush, 21-Jun-06 (Hazelton)
Campbell River and District Chamber of Commerce, Gary Thulin, 07-Jun-06 (Campbell River)
Campbell River Economic Development Corporation, Patrick Marshall, 07-Jun-06 (Campbell River)
Campbell River Environmental Committee, Julie Sigurdson, 11-Oct-06 (Campbell River)
Campbell River Netloft, Doren Anderson, 11-Oct-06 (Campbell River)
Ross Campbell, 19-Jun-06 (Prince Rupert)
Canadian Sablefish Association, Leslie Budden, Dr. John Volpe, 19-Oct-06 (Victoria)
Cards Aquaculture, Aron Brotchie, 28-Jun-06 (Port Hardy)
Steve Carpenter, 05-Oct-06 (Bella Bella)
Central Coast Regional District, Kevin O'Neill, 05-Oct-06 (Bella Coola)
Centre for Aquatic Health Sciences, Linda Sams, 28-Jun-06 (Port Hardy)
Chief Bob Chamberlin, 28-Jun-06 (Port Hardy)
City of Campbell River, Councillor Roy Grant, Councillor Mary Storry, 07-Jun-06 (Campbell River)
George Clark, 20-Jun-06 (Terrace)

Bob Clay, 21-Jun-06 (Hazelton)
Chief Barbara Clifton, 21-Jun-06 (Hazelton)
Coast Mountain Expeditions, Coast Mountain Lodge and Discovery Islands Lodge, Ralph Keller, 11-Oct-06 (Campbell River)
Coast Select Smokehouse, Nick Orton, 27-Jun-06 (Sointula)
Coastal Alliance for Aquaculture Reform, David Lane, Robert Mountain, Craig Orr, Jay Ritchlin, Catherine Stewart, Gerry Thorne, 01-Dec-06 (Vancouver)
Gil Cobb, 06-Oct-06 (Smithers)
Comox First Nation, Barb Mitchell, Ron Frank, 11-Oct-06 (Campbell River)
Concerned Citizens and Friends of Lighthouse Country, Brian Dane, Marty Fortier, 11-Oct-06 (Campbell River)
Roy Cranmer, 26-Jun-06 (Alert Bay)
Creative Salmon, Geoff Bacon, Dave Bailey, Tim Rundle, 06-Jun-06 (Tofino)
Dr. Stephen F. Cross, 19-Oct-06 (Victoria)
Nathan Cullen, MP, Skeena-Bulkley Valley, 06-Oct-06 (Smithers)
Mary G. Dalen, 20-Jun-06 (Terrace)
David Suzuki Foundation, Jay Ritchlin, 18-Oct-06 (Vancouver)
Tim Dayton, 18-Oct-06 (Vancouver)
Denman Island Marine Stewardship Committee, Shelley McKeachie, Pat McLaughlin, 19-Oct-06 (Victoria)
Department of Fisheries and Oceans Canada, Aquaculture Division, Andrew Thomson, 01-Feb-06 (Victoria); 01-Jun-06 (Vancouver); 30-Nov-06 (Vancouver)
Department of Fisheries and Oceans Canada, Marine Ecosystems and Aquaculture Division, Dr. Simon Jones, Ted Perry, Dr. Terri Sutherland, 30-Nov-06 (Vancouver)
Department of Fisheries and Oceans Canada, Ocean Sciences Division, Dario Stucchi, 30-Nov-06 (Vancouver)
Department of Fisheries and Oceans Canada, Regional Director General, Paul Sprout, 01-Feb-06 (Victoria)
Department of Fisheries and Oceans Canada, Regional Director, Science, Laura Richards, 01-Feb-06 (Victoria)
Department of Fisheries and Oceans Canada, Salmon and Freshwater Ecosystems Division, Dr. Brent Hargreaves, Dr. Brian Riddell, 30-Nov-06 (Vancouver)
Department of Fisheries and Oceans Canada, Strategic Media Relations, Donna Martin, 01-Feb-06 (Victoria)
DFO UBC Centre for Aquaculture and Environmental Research, Sustainable Aquaculture, Anthony P. Farrell, 01-Jun-06 (Vancouver)
District of Port Hardy, Mayor Hank Bood, 28-Jun-06 (Port Hardy)
District of Sechelt, Mayor Cameron Reid, 17-Oct-06 (Sechelt)
Randy Dozzi, 20-Jun-06 (Terrace)
Van Egan, 07-Jun-06 (Campbell River)
Englewood Packing Company, Tanya Romas, 27-Jun-06 (Port McNeill)
Lloyd Erickson, 05-Jun-06 (Nanaimo)
Dave Evans, 06-Oct-06 (Smithers)
EWOS Canada Limited, Ross Grierson, Jason Mann, 18-Oct-06 (Vancouver)
Robert Field, 27-Jun-06 (Sointula)
First Dollar Alliance, Leanne Brunt, Barb Walker, 19-Oct-06 (Victoria), 07-Jun-06 (Campbell River)
First Nations Environmental Network, Steve Lawson, 06-Jun-06 (Tofino)
Foetux Forest Technology, Tricia Fawkes, 27-Jun-06 (Port McNeill)
Howard Fowler, 21-Jun-06 (Kitwanga)
Bruce Frank, 06-Jun-06 (Tofino)
Dr. Neil Fraser, 11-Oct-06 (Campbell River)
Friends of Clayoquot Sound, Celina Tuttle, 06-Jun-06 (Tofino)
Friends of Wild Salmon, Andrew Williams, 20-Jun-06 (Terrace), 06-Oct-06 (Smithers)
Ganhada Management Group, Alan Okabe, 19-Jun-06 (Prince Rupert)
Gemini Marine Services, Rob Hoehn, 17-Oct-06 (Sechelt)
Georgia Strait Alliance, Laurie MacBride, 05-Jun-06 (Nanaimo)
Georgia Strait Alliance, Ruby Berry, 17-Oct-06 (Sechelt)
Georgia Strait Alliance / Xwémalhkwu (Homalco) First Nation, Fay Blaney, Eric Blueschke, 07-Jun-06 (Campbell River)

Scott Gibson, 28-Jun-06 (Port Hardy)
Gitanyow Hereditary Chiefs, Glen Williams, 17-Oct-06 (Sechelt)
Gitxsan Treaty Office, Elmer Derrick, 06-Oct-06 (Smithers)
Gitxsan Watershed Authorities, Chris Barnes, Dr. Allen Gottesfeld, 20-Jun-06 (Terrace)
Charles Gladstone, 05-Oct-06 (Bella Bella)
Curtis Gladstone, 06-Oct-06 (Smithers)
Keith Gladstone, 05-Oct-06 (Bella Bella)
James Gordon, 07-Jun-06 (Campbell River)
Larry Greba, 14-Nov-06 (Klemtu)
Green Party of Canada - North Island Constituency, Michael Mascall, 11-Oct-06 (Campbell River)
Green Spirit Strategies Ltd., Dr. Patrick Moore, 18-Oct-06 (Vancouver)
Green Party of British Columbia, David Konsmo, 19-Jun-06 (Prince Rupert)
Grieg Seafood BC Limited, Peter Gibson, Barry Milligan, 07-Jun-06 (Campbell River)
Grieg Seafood BC Ltd., Tim Davies, 19-Oct-06 (Victoria)
Gulf Troll Association, Gary Stoner, 27-Jun-06 (Port McNeill)
Mike Haffenden, 28-Jun-06 (Port Hardy)
Hagwilget Village Council, Vernon Joseph, 21-Jun-06 (Hazelton)
Edmon Hamer, 20-Jun-06 (Terrace)
Sue Hamilton, 27-Jun-06 (Sointula)
Hardy Bay Diving, Rick Harwood, 28-Jun-06 (Port Hardy)
Hardy Buoys, Bruce Dirom, 28-Jun-06 (Port Hardy)
Susanne Hare, 06-Jun-06 (Tofino)
Ron Harris, 21-Jun-06 (Kitwanga)
Richard Harry, 06-Jun-06 (Tofino)
Dr. Brian Hayden, 18-Oct-06 (Vancouver)
George Hayes, 20-Jun-06 (Terrace)
Heiltsuk Nation, Chief Gary Housty, 05-Oct-06 (Bella Bella)
Heiltsuk Tribal Council, William Gladstone, 05-Oct-06 (Bella Bella)
Justin Henry, 17-Oct-06 (Sechelt)
Steve Hidber, 06-Oct-06 (Smithers)
Bruce Hill, 20-Jun-06 (Terrace)
Matt Hill, 19-Jun-06 (Kitkatla)
John Holder, 07-Jun-06 (Campbell River)
Lionel Hole, 28-Jun-06 (Port Hardy)
Ellen Humchitt, 05-Oct-06 (Bella Bella)
Stanley Hunt, 26-Jun-06 (Alert Bay)
Ken Innes, 19-Jun-06 (Kitkatla)
Mel Innes, 05-Oct-06 (Bella Bella)
Island Scallops, Robert Saunders, 05-Jun-06 (Nanaimo)
Rev. Vern Jackson, 19-Jun-06 (Kitkatla)
Dave Jacobson, 28-Jun-06 (Port Hardy)
James Walkus Fishing Company, James Walkus, 28-Jun-06 (Port Hardy)
Guy Johnson, 17-Oct-06 (Sechelt)
Jeff Jones, 27-Jun-06 (Sointula)
Charles Justice, 19-Jun-06 (Prince Rupert)
John Kelson, 06-Oct-06 (Smithers)
Keltic Seafoods, Barney Bjermeland, 28-Jun-06 (Port Hardy)
Dr. Vernon Kemp, 11-Oct-06 (Campbell River)
Mary Kemp, 11-Oct-06 (Campbell River)
Kitasoo-Xai'xais Nation, Chief Archie Robinson, Sr., 14-Nov-06 (Klemtu)
Kim Kornbacher, 05-Jun-06 (Nanaimo)
Nicola Koroluk, 05-Oct-06 (Bella Coola)
Vivian Krause, 24-Nov-06 (Vancouver)

Chief Alice Kruta, Sr., 21-Jun-06 (Hazelton)
Gunnar Kufaas, 28-Jun-06 (Port Hardy)
Kwicksutaineuk/Ah-Kwa-mish First Nation, Chief Bob Chamberlin, 11-Oct-06 (Campbell River), 26-Jun-06 (Alert Bay)
Laich-Kwil-Tach K'ómoks Nation, Chief Russell Kwakseestahla, 11-Oct-06 (Campbell River)
Ron Langdale, 06-Oct-06 (Smithers)
Brian Larson, 21-Jun-06 (Hazelton)
Chief Yvonne Lattie, 21-Jun-06 (Hazelton)
Mitlanova Lawson, 06-Jun-06 (Tofino)
Tim Lenky, 06-Oct-06 (Smithers)
Conrad Lewis, 06-Oct-06 (Smithers)
Lions Gate Fisheries, Christina August, Jack Greig, John Lucas, Alan Orten, 06-Jun-06 (Tofino)
Living Oceans Society, Jennifer Lash, 27-Jun-06 (Sointula)
Bruce Lloyd, 27-Jun-06 (Port McNeill)
David Loewen, 21-Jun-06 (Hazelton)
David Loewen, 06-Oct-06 (Smithers)
Carol Louie, 21-Jun-06 (Hazelton)
Lower Dean River Lodge Ltd., Billy Blewett, 05-Oct-06 (Bella Coola)
James Mackay, 19-Jun-06 (Kitkatla)
Mainstream Canada, Alistair Haughton, 06-Jun-06 (Tofino)
Marine Harvest Canada, Clare Backman, 07-Jun-06 (Campbell River)
Marine Harvest U-14 Boys Soccer, John Jepson, 11-Oct-06 (Campbell River)
Joe Martin, 06-Jun-06 (Tofino)
Moses Martin, 06-Jun-06 (Tofino)
Peter R. Mason, Jr., 05-Oct-06 (Bella Bella)
David McCallum, 05-Jun-06 (Nanaimo)
Raymond McKay, 19-Jun-06 (Kitkatla)
Blair McLean, 11-Oct-06 (Campbell River)
Chief Marjorie McRae, 21-Jun-06 (Hazelton)
Dr. Charles R. Menzies, 24-Nov-06 (Vancouver)
Method Marine Supply, Sean McIntosh, 06-Jun-06 (Tofino)
Chief Ralph Michele, 21-Jun-06 (Hazelton)
Renee Mikaloff, 19-Oct-06 (Victoria)
Ross Mikkelson, 05-Oct-06 (Bella Coola)
Ric Miller, 20-Jun-06 (Terrace)
Don Millerd, 18-Oct-06 (Vancouver)
Ministry of Agriculture and Lands, Larry Pederson, Deputy Minister, 01-Jun-06 (Vancouver)
Ministry of Agriculture and Lands, Animal Health Branch, Dr. Ron Lewis, 01-Jun-06 (Vancouver)
Ministry of Agriculture and Lands, Aquaculture Development, Al Castledine, 01-Feb-06 (Victoria); 01-Jun-06 (Vancouver)
Ministry of Agriculture and Lands, Aquaculture Licensing and Compliance Branch, Compliance and Monitoring Unit, Yves Antaya, 01-Jun-06 (Vancouver)
Ministry of Agriculture and Lands, Fisheries and Aquaculture Licensing and Compliance Branch, Jaclynn Hunter, 01-Feb-06 (Victoria); 01-Jun-06 (Vancouver)
Ministry of Environment, Fish Health Veterinarian, Joanne Constantine, 01-Jun-06 (Vancouver)
Ministry of Environment, Chris Trumpy, Deputy Minister, 01-Jun-06 (Vancouver)
Ministry of Environment, Environmental Protection Division, Vancouver Island Regional Office, Randy Alexander, 01-Feb-06 (Victoria); 01-Jun-06 (Vancouver)
Ministry of Environment, Environmental Protection Division, Vancouver Island Regional Office, Lynn Bailey, 01-Feb-06 (Victoria)
Ministry of Environment, Environmental Quality Section, Vancouver Island Region, Eric McGreer, 01-Feb-06 (Victoria)

Ministry of Environment, Oceans & Marine Fisheries Division, Bud Graham, 25-Apr-06 (Victoria), 01-Jun-06 (Vancouver)
Patrick Albert Mitchell, 21-Jun-06 (Hazelton)
Cecil Moody, 05-Oct-06 (Bella Coola)
Reg Moody, 05-Oct-06 (Bella Bella)
Larry Moore, 21-Jun-06 (Kitwanga)
Chief Barney Morgan, 21-Jun-06 (Hazelton)
Réjeanne Morin, 05-Oct-06 (Bella Coola)
Bill Mounce, 20-Jun-06 (Terrace)
Mulder Marine Ventures Limited, Jason Mulder, 06-Jun-06 (Tofino)
Chief George Muldoe, 21-Jun-06 (Hazelton)
Musgamagw Tsawataineuk Tribal Council, Robert Mountain, 26-Jun-06 (Alert Bay)
'Namgis First Nation, Chief Bill Cranmer, Dr. Marty Weinstein, 26-Jun-06 (Alert Bay)
'Namgis First Nation / Mamalilikulla Band, Chief Art Dick, 26-Jun-06 (Alert Bay)
Les Neasloss, 14-Nov-06 (Klemtu)
Ross Neasloss, 14-Nov-06 (Klemtu)
John Nelson, 06-Oct-06 (Smithers)
Noboco Styro Containers Ltd., Cory Percevault, 11-Oct-06 (Campbell River)
North Coast Steelhead Coalition; Friends of Wild Salmon, Kathy Larson, 21-Jun-06 (Hazelton)
North Island Biological Consultants, David Schmidt, 27-Jun-06 (Port McNeill)
Northern Aquaculture, Peter Chettleburg, 19-Oct-06 (Victoria)
Northwest Institute, Allan McNeeley, Pat Moss, 21-Jun-06 (Hazelton)
Nuxalk First Nation, Chief Peter Siwallace, Chief Deric Snow, 05-Oct-06 (Bella Coola)
Nuxalk Nation, Jason Moody, 05-Oct-06 (Bella Coola)
Ocean Pacific Marine Supply, Bruce Kempling, 11-Oct-06 (Campbell River)
Ocean West Industries, Warren (Whitey) Bernard, 06-Jun-06 (Tofino)
Office of the Wet'suwet'en, Chief Alphonse Gagnon, Ron Austin, Chief (Roy Morris) Woos, 21-Jun-06 (Smithers)
Office of the Wet'suwet'en, Walter Joseph (Hazelton)
Office of the Wet'suwet'en, Natural Resources Dept., Stefan Schug, 06-Oct-06 (Smithers)
Okeover Ratepayers Association, Paul Schachter, 17-Oct-06 (Sechelt)
Omega Pacific Seafarms Inc. / Omega Pacific Hatchery Inc., Carol Schmitt, 05-Jun-06 (Nanaimo)
Susan O'Neill, 05-Oct-06 (Bella Coola)
Karl Osmers, 05-Oct-06 (Bella Coola)
Pacific Organic Seafood Association, Dr. David Groves, 06-Jun-06 (Tofino)
Pan Fish Canada, Mark Ayranto, 19-Jun-06 (Prince Rupert)
Pan Fish Canada, Alan Sutherland, 07-Jun-06 (Campbell River)
David Parker, 27-Jun-06 (Sointula)
Andy Peers, Sr., 05-Oct-06 (Bella Bella)
Penta Transport, Gordon Putz, 05-Jun-06 (Nanaimo)
Port Hardy Chamber of Commerce, Marty Whitehead, 28-Jun-06 (Port Hardy)
Positive Aquaculture Awareness Society, Scott Krompocker, Ian Roberts, 07-Jun-06 (Campbell River)
Kathy Poslowsky, 28-Jun-06 (Port Hardy)
PR Aqua Ltd., Wayne Gorrie, 05-Jun-06 (Nanaimo)
Raincoast Conservation Society, Chris Williamson, 05-Oct-06 (Bella Bella)
Raincoast Conservation Society, Michael Price, 19-Oct-06 (Victoria)
Raincoast Research, Alexandra Morton, 27-Jun-06 (Sointula)
Howard Rees, 28-Jun-06 (Port Hardy)
Regional District of Mt. Waddington, Marilyn MacArthur, 27-Jun-06 (Port McNeill)
Raija Reid (for Fred Reid), 05-Oct-06 (Bella Bella)
Rom Richdale, 05-Oct-06 (Bella Coola)
Mike Ridsdale, 19-Jun-06 (Kitkatla)
Ritchie Foundation, Rupert Gale, 11-Oct-06 (Campbell River)
Ian Roberts, 14-Nov-06 (Klemtu)

Ben Robinson, 14-Nov-06 (Klemtu)
Gary Robinson, 14-Nov-06 (Klemtu)
Teresa Robinson, 11-Oct-06 (Campbell River)
Kathleen Ruff, 06-Oct-06 (Smithers)
Theresa Ryan, 19-Jun-06 (Kitkatla)
Joan Sawicki, 05-Oct-06 (Bella Coola)
Seaspring Salmon Farm Ltd., Dr. David Groves, 05-Jun-06 (Nanaimo)
Sierra Club of Canada - Quadra Island Group, Ray Grigg, Noel Lax, 07-Jun-06 (Campbell River)
Sierra Legal Defence Fund, Sean Nixon, 18-Oct-06 (Vancouver)
Silvertip Eco Tours Limited, Fred Seiler, 20-Jun-06 (Terrace)
Wendy Simmonds, 17-Oct-06 (Sechelt)
Simon Fraser University, Dept. of Biological Sciences, Dr. Larry J. Albright, 18-Oct-06 (Vancouver)
Simon Fraser University, Statistics and Actuarial Science, Dr. Rick Routledge, 18-Oct-06 (Vancouver)
Skeena Angling Guides Association, Greg Knox, 20-Jun-06 (Terrace)
Skeena Native Development Society, Chief Glenn Barrett, Clarence Nyce, 20-Jun-06 (Terrace)
Skeena Watershed Conservation Coalition, Jim Allen, Shannon McPhail, 21-Jun-06 (Hazelton)
Kathy Smail (for Dr. Judith Williams), 11-Oct-06 (Campbell River)
Sonora Resort and Conference Centre, Sean Ross, 11-Oct-06 (Campbell River)
Cristina Soto, 21-Jun-06 (Hazelton)
Southside Welding Ltd., Dennis Walker, 11-Oct-06 (Campbell River)
Sue Spalding, 20-Jun-06 (Terrace)
Sport Fishing Institute of BC, Eric Kristianson, 11-Oct-06 (Campbell River)
Wayne Star, 14-Nov-06 (Klemtu)
Brian Starr, 05-Oct-06 (Bella Bella)
Todd Stockner, 21-Jun-06 (Hazelton)
Stuart Island Community Association, Cathy Minor, Roger Minor, 11-Oct-06 (Campbell River)
Sunshine Coast Conservation Association, Brad Benson, 17-Oct-06 (Sechelt)
Suskwa Watershed, Lloyd Austin, 06-Oct-06 (Smithers)
Bruce Swift, 18-Oct-06 (Vancouver)
Syndel Laboratories Ltd., Dr. Jim Powell, 19-Oct-06 (Victoria)
T. Buck Suzuki Environmental Foundation, Arnie Nagy, Des Nobels, 19-Jun-06 (Prince Rupert)
Taplow Feeds, Brad Hicks, 18-Oct-06 (Vancouver)
Target Marine Products LLP, Bernie Bennett, 17-Oct-06 (Sechelt)
T-Buck Suzuki Environmental Foundation, David Lane, 17-Oct-06 (Sechelt)
Telegraph Cove Resorts, Gordie Graham, 27-Jun-06 (Port McNeill)
Terram Foundation, Rodrigo Pizarro, 18-Oct-06 (Vancouver)
Thunder Bay Saw Shop Ltd., Sharon Robinson, 17-Oct-06 (Sechelt)
Tofino Business Association, Dave Griffiths, 06-Jun-06 (Tofino)
Gordon Tolmie, 06-Oct-06 (Smithers)
Town of Gibsons, Mayor Barry Janyk, 17-Oct-06 (Sechelt)
Town of Port McNeill, Mayor Gerry Furney, 27-Jun-06 (Port McNeill)
Tsawataineuk First Nation, Chief Eric Joseph, 26-Jun-06 (Alert Bay)
Teresa Tynjala, 27-Jun-06 (Sointula)
United Fishermen and Allied Workers Union, Joy Thorkelson, 19-Jun-06 (Prince Rupert)
United Fishermen and Allied Workers Union - CAW - Local 15, Garth Mirau, 19-Oct-06 (Victoria)
University of Victoria, Environmental Law Centre, Adam Driedzic, Chris Tollefson, 19-Oct-06 (Victoria)
University of Victoria, School of Environmental Studies, John Volpe, 19-Oct-06 (Victoria)
Michelle Vickers, 05-Oct-06 (Bella Bella)
Village of Hazelton, Doug Donaldson, 21-Jun-06 (Hazelton)
Walcan Seafood Ltd., Bill Pirie, 11-Oct-06 (Campbell River)
Barb Walker, 28-Jun-06 (Port Hardy)
Alvin Walkus, 28-Jun-06 (Port Hardy)
Watershed Watch Salmon Society, Dr. Craig Orr, 18-Oct-06 (Vancouver)

Bruce Watson, 19-Oct-06 (Victoria)
Wavemaster Canada Ltd., Doug Louvier, 18-Oct-06 (Vancouver)
Chief Alvin Weget, 21-Jun-06 (Hazelton)
West Coast Fishculture Ltd., Bill Vandervert, 17-Oct-06 (Sechelt)
Western Canada Wilderness Committee, Geoff Senichenko, 17-Oct-06 (Sechelt)
Heidi Westfall, 21-Jun-06 (Hazelton)
Chief Clifford White, 19-Jun-06 (Kitkatla)
Georgia White, 05-Oct-06 (Bella Bella)
Wilderness Tourism Association, Brian Gunn, 27-Jun-06 (Port McNeill)
Chief Gary Williams, 21-Jun-06 (Kitwanga)
Chief Art Wilson, 21-Jun-06 (Hazelton)
Ken Wilson, 05-Oct-06 (Bella Bella)
Michael Wilson, 05-Oct-06 (Bella Bella)
Ross Wilson, 05-Oct-06 (Bella Bella)
Rupert Wilson, 28-Jun-06 (Port Hardy)
Janine Wood, 19-Oct-06 (Victoria)
Alice Woods, 11-Oct-06 (Campbell River)
Xwémalhkwu (Homalco) First Nation, Chief Darren Blaney, 11-Oct-06 (Campbell River)
Z-Boat Lodge River Guides, Brad Zeerip, 20-Jun-06 (Terrace)

APPENDIX D: WRITTEN SUBMISSIONS

Dianne Ackerman, SCSA-2006-531
Dave Adams, SCSA-2006-140
Tarquinn Adams-Beck, SCSA-2006-61
Darcie Addison, SCSA-2006-168
Aggressive Tube Bending Inc., Bob Georgison, SCSA-2006-349
Albacore II Charters, David M. Anderson, SCSA-2006-374
Jessica Alford, SCSA-2006-640
Darla Allary, SCSA-2006-517
Ann Allen, SCSA-2006-262
Donald Allen, SCSA-2006-484
Domenic Amara, SCSA-2006-806
David Anderson, SCSA-2006-322
Suzanne Andre, SCSA-2006-597
John Andrew, SCSA-2006-753
Mary Andrews, SCSA-2006-650
Aqua-Pak, Tim Dayton, SCSA-2006-247
Dianne Aquilina, SCSA-2006-109
Kim Arbeau, SCSA-2006-203
Saul Arbess, SCSA-2006-703
David Armstrong, SCSA-2006-344
Maryse Arnold, SCSA-2006-618
Arrowsmith Naturalists, Roger Simms, SCSA-2006-609
Jennifer Arthur, SCSA-2006-298
Dave Ashcroft, SCSA-2006-26
Michael Aske, SCSA-2006-80
Julie, Wilfred, Alanda & Taylor Atleo, SCSA-2006-297
Dr. Ronald James Austin, SCSA-2006-687
BC Salmon Farmers Association, Jim Abram, SCSA-2006-4
BC Salmon Farmers Association, Doug Louvier, SCSA-2006-335
BC Salmon Farmers Association, Mary Ellen Walling, SCSA-2006-822
B. C. Aquifer, Jay Jaundrew, SCSA-2006-102
BC Federation of Fly Fishers, Gilbert Sage, SCSA-2006-675
Ursula Backlund, SCSA-2006-393
Geoffrey M. H. Bacon, SCSA-2006-341
Lakhminder Bains, SCSA-2006-314
Thomas Baker, SCSA-2006-741
Herman Bakker, SCSA-2006-521
Raj Bakshi, SCSA-2006-272
Kristina Balbon, SCSA-2006-71
Richard Baldwin, SCSA-2006-574
Dr. Jennifer Balke, SCSA-2006-433
Stephen Barber, SCSA-2006-197
Kim Barker, SCSA-2006-299
Diane Barter, SCSA-2006-319
Hardish Basra, SCSA-2006-330
Ken Beckthold, SCSA-2006-381
Shane Beckthold, SCSA-2006-666
Phil Beeley, SCSA-2006-453
Linda Belanger, SCSA-2006-601
Eugene Belanko, SCSA-2006-664
Warren Bell, SCSA-2006-546
Eoin Benett, SCSA-2006-444
Ramona Bennett, SCSA-2006-211
Douglas Bennion, SCSA-2006-260
Dale Bent, SCSA-2006-553
Jodi Bercic, SCSA-2006-112
Charlie Bibby, SCSA-2006-141
Trish Bisset, SCSA-2006-110
Dale Blackburn, SCSA-2006-410
Greg Blanchette, SCSA-2006-431
Leone Bliss, SCSA-2006-241
Gary Bogoski, SCSA-2006-173
David A. & Joan E. Boon, SCSA-2006-373
Patricia Boon, SCSA-2006-661
Robert Boone, SCSA-2006-309
Rocky Boschman, SCSA-2006-29
Devin Botting, SCSA-2006-480
Nathon Botting, SCSA-2006-474
Brad Boyce, SCSA-2006-422
Danny Boyce, SCSA-2006-452
David Boyes, SCSA-2006-565
Ed Brennan, SCSA-2006-83
Kristi Bridgeman, SCSA-2006-663
Linda Brooks, SCSA-2006-254
Corey Brown, SCSA-2006-54
Merle Brown, SCSA-2006-214
Richard Brown, SCSA-2006-67
Vickie Brown, SCSA-2006-796
Eleanor Brownlee, SCSA-2006-648
Brown's Bay Packing Company, David Stover, SCSA-2006-230
Karen Bunz, SCSA-2006-275
Chris Burbidge, SCSA-2006-508
Karen Burger, SCSA-2006-36
Burke Mountain Naturalists, Elaine Golds, SCSA-2006-738
Kulvinder Burm, SCSA-2006-313
Kim Burns, SCSA-2006-382
Gerry Burry, SCSA-2006-27
Corine Buse, SCSA-2006-72

Steve Cahill, SCSA-2006-114
Campbell River Economic Development Corporation, Patrick Marshall, SCSA-2006-432
Ross Campbell, SCSA-2006-438
Canadian Sablefish Association, Eric Wickham, SCSA-2006-466
Barbara Cannon, SCSA-2006-278
J. Capozzelli, SCSA-2006-780
Stewart Carlos, SCSA-2006-137
Sheila Carnegie, SCSA-2006-567
Ronald Carson, SCSA-2006-60
Catalyst Paper, Elk Falls Division, Norm Facey, SCSA-2006-489
Central Westcoast Forest Society, Don McMillan, SCSA-2006-353
Cherie Chalmers, SCSA-2006-46
Jan Chamberland, SCSA-2006-776
Gary Chan, SCSA-2006-115
Paul T. Charette, SCSA-2006-674
Janine Charlesworth, SCSA-2006-284
Owen Charlesworth, SCSA-2006-385
Irene Charlton, SCSA-2006-234
Jeff Chilton, SCSA-2006-559
Trudy Chin, SCSA-2006-771
Carl Christensen, SCSA-2006-482
Patricia Christl, SCSA-2006-274
Paul Chytyk, SCSA-2006-654
City of Campbell River, Councillor Roy Grant, SCSA-2006-501
Andy Clark, SCSA-2006-39
Alan Clausen, SCSA-2006-90
Philip Clement, SCSA-2006-392
Chad Cleveland, SCSA-2006-142
Jean Coallier, SCSA-2006-320
Coastal Seatrucking Ltd., Bill Vaughn, SCSA-2006-228
Coastland Fabricating & Design Group Ltd., Peter Madden, SCSA-2006-292
Deborah Cohen, SCSA-2006-816
Helen M. Colly, SCSA-2006-376
Maria Coombs, SCSA-2006-13
Tony Cooper, SCSA-2006-560
A. Cathryn Corbett, SCSA-2006-770
Andrea Corbett, SCSA-2006-588
Bill Cordray, SCSA-2006-529
Carol Cornish, SCSA-2006-769
Heather Cosgrove, SCSA-2006-446
Council of Tourism Associations, Mary Mahon Jones, SCSA-2006-469
Robert Countess, SCSA-2006-174
Elizabeth Cowan, SCSA-2006-692
James Cowan, SCSA-2006-554
Bill Crawford, SCSA-2006-308
Creative Salmon, Dave Bailey, SCSA-2006-194
Creative Salmon, Spencer Evans, SCSA-2006-468
Ken Crewe, SCSA-2006-23
June Croft, SCSA-2006-448
Shawn Croft, SCSA-2006-449
Bev Crozier, SCSA-2006-111
Jim Culp, SCSA-2006-715
Andrew Cupido, SCSA-2006-549
Brian Currie, SCSA-2006-511
Ljubomir Cvjetan, SCSA-2006-118
Alan Cyr, SCSA-2006-255
Anne Daletski, SCSA-2006-807
Adam Dalton, SCSA-2006-183
Brian Dalton, SCSA-2006-176
Cynthia Dalton, SCSA-2006-162
Brian Dane, SCSA-2006-652
Reinhart Daur, SCSA-2006-510
David Suzuki Foundation, Marine Conservation, Margo Metcalfe, SCSA-2006-729
Adrienne David, SCSA-2006-362
Wendy Davidoff, SCSA-2006-273
Paulette Davies, SCSA-2006-594
Kerri Davis, SCSA-2006-753
Mike Davis, SCSA-2006-483
Trevor Dawes, SCSA-2006-65
Darcy Day, SCSA-2006-150
Clive Dayson, SCSA-2006-502
Tim Dayton, SCSA-2006-251
Sharon De Dominicis, SCSA-2006-93
Joseph S. De Gisi, SCSA-2006-736
Manly A. de Roux, SCSA-2006-734
Michele Deakin, SCSA-2006-598
Steve Deal, SCSA-2006-479
Vicki deBoer, SCSA-2006-620
Janet DeCraene, SCSA-2006-84
Denman Island Marine Stewardship Committee, Pat McLaughlin, SCSA-2006-682
Bradley Deptford, SCSA-2006-129
Brent Desilets, SCSA-2006-387
Marc deWinter, SCSA-2006-417
David Dickinson, SCSA-2006-494
Diggers Web Design, Laurie Rundle, SCSA-2006-364
Alan Dilworth, SCSA-2006-357
Dan Dings, SCSA-2006-471
Bronwen Dinsmore, SCSA-2006-754
Melissa Dinwiddie, SCSA-2006-802
Laura Dipalo, SCSA-2006-259
Shirley Dishaw, SCSA-2006-671

District of Houston, Sharon Smith, SCSA-2006-340
District of New Hazelton, Pieter Weeber, SCSA-2006-126
District of Port Hardy, Mark Ayranto, SCSA-2006-235
Mike Dobbs, SCSA-2006-409
Lisa Doepker, SCSA-2006-312
Stephan Donovan, SCSA-2006-793
Dian & James Dougan, SCSA-2006-760
Jamie Douglas, SCSA-2006-222
Joseph Douglas, SCSA-2006-99
Roger Douglas, SCSA-2006-135
Peter Duenner, SCSA-2006-795
Andrew Dukes, SCSA-2006-169
Allen Duncan, SCSA-2006-612
Shari Dunnet, SCSA-2006-462
Laura Dupont, SCSA-2006-679
Ian Durke, SCSA-2006-290
Margaret Dyke, SCSA-2006-592
Suzi Dyson, SCSA-2006-24
Sherryl Eagle, SCSA-2006-369
Earthling Enterprises, Jackie Hildering, SCSA-2006-717
Julie Edwards, SCSA-2006-737
Maureen Elwood, SCSA-2006-527
Carolyn Emo, SCSA-2006-593
Stephen Empey, SCSA-2006-470
Aram Evans, SCSA-2006-293
EWOS Canada Limited, Russell Strang, SCSA-2006-359
Laverne Faithful, SCSA-2006-217
Chris Falconberg, SCSA-2006-153
Teri Farmer, SCSA-2006-77
Jane and Patrick Fawkes, SCSA-2006-366
George Fifield, SCSA-2006-485
Richard Finch, SCSA-2006-537
First Nations Environmental Network, Steve Lawson, SCSA-2006-10
First Nations Environmental Network, Teresa Binstock, SCSA-2006-11
James Fisher, SCSA-2006-735
Lisa Fleming, SCSA-2006-551
Scott Fleming, SCSA-2006-477
Judy Flintoff, SCSA-2006-269
Robert Flower, SCSA-2006-182
Bobbi Flowers, SCSA-2006-791
Doreen Forbes, SCSA-2006-691
Rachel Forbes, SCSA-2006-505
Steve Ford, SCSA-2006-739
Dave Fowler, SCSA-2006-79
Alison France, SCSA-2006-171
Ian Francis, SCSA-2006-486
Kirk Francis, SCSA-2006-810
Lee Frank, SCSA-2006-808
Peggy Frank, SCSA-2006-584
Jim Frankforth, SCSA-2006-223
L. Neil Frazer, SCSA-2006-439
M. Carol Freeman, SCSA-2006-504
Alejandro Frid, SCSA-2006-766
Friends of Clayoquot Sound, Dom Repta, SCSA-2006-744
Louise Friesen, SCSA-2006-263
Tim Fuchs, SCSA-2006-498
Stephen Fukul, SCSA-2006-406
Fusilli Grill, Kelley Lane, SCSA-2006-52
Peter Fussell, SCSA-2006-310
Shizu E. M. Futa, SCSA-2006-625
Kris Gaddes, SCSA-2006-136
Susan Gage, SCSA-2006-550
Catherine Gamroth, SCSA-2006-538
Bo Garrett, SCSA-2006-541
Lydia Garvey, SCSA-2006-788
James Gaskill, SCSA-2006-37
Nancy Gathing, SCSA-2006-787
Jacques Gaudet, SCSA-2006-414
Marie Gaudreau, SCSA-2006-772
Donna Gault, SCSA-2006-303
James Gaves, SCSA-2006-699
Guillaume Gendron, SCSA-2006-617
Patrick Gendron, SCSA-2006-706
Karen George, SCSA-2006-266
Stanley George, SCSA-2006-146
Gerrard-Ovalstrapping, A. Garth Eland, SCSA-2006-402
Adella Gerry, SCSA-2006-705
Nicole Gervais, SCSA-2006-403
Michael Gibbs, SCSA-2006-143
Denise Gibson, SCSA-2006-220
Bill Giesbrecht, SCSA-2006-476
Jaswinder Gill, SCSA-2006-268
Greg Gille, SCSA-2006-811
Gitksan Government Commission, Chief Mamie Wesley, SCSA-2006-493
Gitxsan Chiefs Office, Christine Scotnicki, SCSA-2006-724
Marnie Godmaire, SCSA-2006-256
Dan Goldman, SCSA-2006-693
Carol Goldstein, SCSA-2006-792
Judy Goodman, SCSA-2006-773
Linda Gorman, SCSA-2006-621
Susan E. Gough, SCSA-2006-447

Erin Goulet, SCSA-2006-445
Greg Goulet, SCSA-2006-405
Elizabeth Gram, SCSA-2006-556
Dar Graves, SCSA-2006-154
Ryan Greaves, SCSA-2006-461
Ryan Gregoire, SCSA-2006-87
Tim Grier, SCSA-2006-777
Caitlin Grieve, SCSA-2006-616
William E. Griffith, SCSA-2006-748
Ray Grigg, SCSA-2006-281
Christian W. Gronau, SCSA-2006-390
Ravi Grover, SCSA-2006-781
Oscar Grubwieser, SCSA-2006-544
Gulf Troll Association, Steve Bergh, SCSA-2006-231
Mike Gunn, SCSA-2006-62
Gwaii Haanas Tour Operators Association, Gord Pincock, SCSA-2006-614
Trevor J. Haaf, SCSA-2006-642
Haig-Brown Fly Fishing Association, Garth Fowler, SCSA-2006-610
Robert Haines, SCSA-2006-354
Terry Hale, SCSA-2006-519
Carla Hall, SCSA-2006-440
David Hall, SCSA-2006-372
Brad Hallam, SCSA-2006-420
Angelika Hanko, SCSA-2006-794
Shanon Hanley, SCSA-2006-267
Terrence R. Hanna, SCSA-2006-740
Alfred Hansen, SCSA-2006-487
Karen Hansen, SCSA-2006-659
Lynn Hardy, SCSA-2006-167
Terry Hare, SCSA-2006-686
Laura Harper, SCSA-2006-813
Noel Harrow, SCSA-2006-512
Barbara Hart, SCSA-2006-337
Hatchery International Magazine, Jeremy Thain, SCSA-2006-209
Fred and Linda Hawkshaw, SCSA-2006-3
Dr. Brian Hayden, SCSA-2006-395, SCSA-2006-378
Denise Hayward, SCSA-2006-34
Gretchen Healy, SCSA-2006-783
Jozef Heemels, SCSA-2006-271
Melvin Heijari, SCSA-2006-327
Caroline Heim, SCSA-2006-600
Thorsten Heimann, SCSA-2006-591
Gordon Heimbecker, SCSA-2006-258
Jill Hein, SCSA-2006-786
Mindy Hemstalk, SCSA-2006-384
Bill Henderson, SCSA-2006-528
Kathleen Henderson, SCSA-2006-533
Jackie Hendrix, SCSA-2006-491
Valerie Hennell, SCSA-2006-599
Justin Henry, SCSA-2006-443
Leslie Henry, SCSA-2006-166
Cory Henschke, SCSA-2006-187
J. Kale Henschke, SCSA-2006-175
Laura Herndon, SCSA-2006-814
Benjamin Hickman, SCSA-2006-356
Shirley Hickman, SCSA-2006-355
Brian Higgs, SCSA-2006-641
Joel Hildebrandt, SCSA-2006-804
Dr. Simon A. Hinke, SCSA-2006-9
Janet Hitt, SCSA-2006-815
Debbie Hobson, SCSA-2006-121
Justin Hobson, SCSA-2006-86
Bernie and Dorothy Hofs, SCSA-2006-582
Donna Hogarth, SCSA-2006-21
John P. Holder, SCSA-2006-434
Kevin Holliston, SCSA-2006-289
Robert A. Holm, SCSA-2006-380
Jennifer Holme, SCSA-2006-253
Romilla Hombrebueno, SCSA-2006-239
C. D. Hood, SCSA-2006-677
Michael Hoskin, SCSA-2006-503
Michael and Marlene Hoskin, SCSA-2006-721
Jim Houlihan, SCSA-2006-199
Jacquie Howardson, SCSA-2006-518
David Huchelega, SCSA-2006-106
Randal Hunt, SCSA-2006-6
David John Huntley, SCSA-2006-368
Stan Hutchings, SCSA-2006-659
Hazel Iennox, SCSA-2006-732
Ashya Ikbal, SCSA-2006-282
John Ilett, SCSA-2006-189
Darren Ingersoll, SCSA-2006-28
Randall Inman, SCSA-2006-585
Colin Innes, SCSA-2006-50
Keith Innes, SCSA-2006-45
Timothy Innes, SCSA-2006-100
Integrated Aqua Systems, Tim Langdon, Lionel Linke, SCSA-2006-436
Island Communications Ltd., Sandy Schickerowsky, SCSA-2006-226
Island Scallops, Barb Bunting, SCSA-2006-606
Islands Trust, Louise Bell, SCSA-2006-627
Islands Trust, Kim Benson, SCSA-2006-516
Islands Trust, Sheila Malcolmson, SCSA-2006-702
Joanna Jack, SCSA-2006-149
Reginald Jack, SCSA-2006-148
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